THE IRON AGE -- September 29, 1932

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THE IRON AGE PUBLISHING COMPANY, 239 WEST 39th ST., NEW YORK
Division of United Business Publishers, Inc.

F. J. FRANK, *President* G. H. GRIFFITHS, *Secretary* C. S. BAUR, *General Advertising Manager*

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THE IRON AGE PUBLISHING CO.
Member, Audit Bureau of Circulations
Member, Associated Business Papers

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50, including duty; Foreign, $12.00 a year. Single Copy 25 Cents

Cable Address: "Ironage, N.Y."

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These are times when every effort must count and when production costs must be cut to the bone . . . times when Warner & Swasey engineering service comes to the front more than ever before. W & S engineers have helped hundreds of manufacturers solve their turret lathe problems by showing where new methods or new machines may be profitably installed. They are ready to give you the benefit of their services without cost or obligation.

You cannot afford to overlook the savings that can be made by more efficient methods

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The Warner & Swasey Company

Cleveland, Ohio, U. S. A.

..THE IRON AGE..

NEW YORK, SEPTEMBER 29, 1932

ESTABLISHED 1855

Vol. 130, No. 13

Metal Products in Tomorrow's Markets

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EARTHQUAKES alter landscapes. The major economic convulsions which have shaken the foundations of industry during the past three years have necessarily destroyed old landmarks and raised new ones. Already we can observe perceptible shifts and upheavals in our industry and in its markets.

Executives of machinery and metal-working establishments are facing and will continue to confront problems that cannot be solved with the aid of precedent. Heretofore the future could be projected from past performance with reasonable surety. Today, looking backward is of small help in forward planning.

Especially is this true in merchandising and marketing under the existing and prospective altered conditions. Curtailment and shifts in consuming power, a decided alteration in the identity and relative importance of company units, realinement of executive personnel in surviving establishments, all introduce new and serious problems of product disposal.

Selling and ***buying*** have moved "upstairs." They are now executive functions in the broad sense and will remain so for a long time to come. Especially is this true with regard to merchandising. It is indeed the fortunate and exceptional plant whose executives, from president to shop superintendent, are not now "burning the midnight oil" in the endeavor to discover effective sales stimulants.

Distribution, under this intensive study, has revealed its intimate relationship to design, selection of product, price policy and cost reduction. No longer can these subjects be filed in separate pigeonholes of detached responsibility. With ***buying,*** these concomitants of ***selling*** have moved upstairs and are receiving the closest executive scrutiny.

It is for this reason that **Modern Merchandising in the Metal-Working Industry** is receiving and will, for some time to come, receive emphasis in the editorial pages of THE IRON AGE. The article which immediately follows is the third in this general series. It deals with the vitally important relation of product selection and improvement to the building of sales volume.

Many other closely connected phases of business rebuilding in the metal-working industry will be considered by selected authors of specialized experience and progressive outlook. It will be our purpose thus to bring to executives in our industry an intimate and timely aid in the study and solution of their most pressing problems.

John H. Van Deventer, Editor.

▲ ▲ ▲ How Modern Design Policies

AFTER the War, and especially after the 1921 panic, attention in reducing costs on all kinds of mechanical products was concentrated on cutting labor costs. This was accomplished by redesigning to eliminate operations, but mostly by efficiency methods in the production shops. It was an advance over the pre-war "efficiency" period, because it set about to cut costs by better equipment and more intelligent factory arrangements rather than by speeding up labor. It necessitated redesign of plant and mill machinery for automatic and semi-automatic operation, which brought the problems home to the designer, but in the main cost reduction at that time was a management and production problem rather than one especially marked out for the designer.

Today, cost reduction is largely in the lap of the designer, although its effects go directly back into the shop. In this the designer cannot depend upon labor saving alone because labor is now one of smallest single items in most products. In one radio retailing at more than $200 the cost of labor is less than $15. The average found for a large group of machines and mechanical devices is less than 8 per cent for labor. If a 10 per cent saving can now be made in labor costs it is seen to affect the sales cost but little.

The heavy items of cost are those for distribution. As high as 60 per cent of the selling price is frequently being paid to the distributers alone. In the case of unusual products, where the demand has to be created, the sales cost is even more excessive. One spraying apparatus, which retails at $5, costs only 92c. to manufacture, including materials, labor, overhead and a manufacturing profit. In other words, 82 per cent of the sales price goes for advertising and selling. This item is typical of a great number of articles.

If the designer, therefore, intends to make any large dent in costs at this time he must contemplate methods that will help to cut into that very large item of distribution expense, remembering that a 2 per cent saving there will in many cases equal a 20 per cent cut on labor. He must design sales helps into his product. He must do this by a redesign that can be sold on price like the traditional "hot cakes," so that very large sales commissions will be unnecessary. Or he must make the article so attractive

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LABOR is now one of the minor elements of cost in many consumer products. The objectives of design, therefore, are no longer primarily aimed at speeding production, but at decreasing distribution costs.

How the depression has caused our designing engineers to become "sales-minded" is told by the author, who relates numerous examples of successful breaking down of sales resistance through the redesign of products.

This is the second article by Mr. Brady in THE IRON AGE'S new series covering the various problems of modern merchandising in the metal-working industry.

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and containing so many appealing features that the consumers will seek it rather than be driven into buying.

Once such a program has been launched it will be found that the engineering department will come out of its smoked glass atmosphere and become a dynamic part of the executive organization. It will become a place of practical ideas rather than of pictures. The engineering dreams that require 82 per cent of the sales price to "put across" will be relegated to the limbo of record books by the chief engineer who has the real fundamental interests of the business in his mind. These statements are not theoretical. They are based on the movement that is actually taking place at the present time in development work.

Engineers Are Becoming Sales-Minded

The depression has been instrumental in making the engineer more sales-minded than ever before. The old theory of the salability of the best mouse trap, which was smothered by the avalanche of a ballyhoo type of advertising and high-pressure selling, is again coming forward as a safer and saner doctrine. Advertising and selling are necessary functions in proper proportions, but they are seldom or never worth 60 to 90 per cent of the cost of the article to the consumer.

The very best sales organization cannot sell a product efficiently and without great expense if that product is inferior in appearance and in performance to the products of its competitors. Points of superiority must be apparent. The obscure, indefinite, debatable points are the ones that have to be sold by expensive ballyhoo and repetitive driving. To cut down that expense it is vital that the engineering organization learn what is required and expected by the customer, and then design those wants into the product as nearly as can be to conform to the production possibilities of the shop. This naturally requires intensive cooperation between sales, engineering and production staffs.

Design Can Cut General Overhead

Another heavy item of expense with many large companies is the overhead that is tacked on the factory costs, which in some cases is as high as 200 to 300 per cent. Any part of this overhead that has to do with the means of financing the business is outside of the scope of either the designer or the production man. But if the engineer can produce designs that are simpler to manufacture so that factory space and equipment requirements can be reduced, then he is really arriving at an ultimate reduction in overhead.

In the consumer products field two mechanical-electrical appliances can be taken as examples of what has been done lately to achieve sales in highly competitive markets—one the electric washer, and the other the electric range. In the washer field a condition had existed where each company had jealously watched the others and incorporated modifications of every change, so that the sales departments had no real distinguishing arguments beyond slight differences in materials and finishes, and had to depend upon price cuts. When prices had been slashed by competition to approximately half of what the trade considered normal, the Syracuse Washing Machine Co. decided that it would cut itself loose from this class of competition. It made an extensive sales engineering study of the field, determined to give the market fully as much as the other companies were giving in a low-priced staple machine, but to give also a better machine at a higher but more economic manufacturing price, and then to have a de luxe machine which would have outstanding mechanical features that could be seen and appre-

Cut Distribution Costs ▲ ▲ ▲

By GEORGE S. BRADY

ciated at once by customers who were willing to pay for tangible quality.

Actually, it took two years of work to realize these ends in spite of a long experience in the business. Every item in the machine was analyzed critically. Every possible sales argument and customer objection was brought up, all the back correspondence regarding troubles or suggested changes was checked. Every advantage of this and that material was scrutinized, and every commercial part that might be fitted in economically or which might add to the sales prestige was given a hearing. Models were built for test and criticism. Even a sculptor was called in to view the appearance of the machine in its relation to the surroundings into which it was to be sold.

The result was a series of machines that were compact, efficient in operation, tinkerproof, requiring no servicing or oiling, and of fine appearance. This company took the lead in sales the next year, beating all its own records, although it was a year of general depression. All of this investigation work, and then the observation that competitors jumped in to copy designs, impressed upon the minds of the engineers and sales staff that arguments regarding "the best that can be bought" were futile. Both the chief engineer and the sales manager related to me that it had served to prove to them that what they had themselves considered "ultimate achievements" the year before were outclassed by what they could produce with constant research and experience. They consequently set up an organization to keep engineering at the forefront and in constant cooperation with the sales and management ends of the business.

Electric "Cooking Machine" Provides Apt Example

The case of the electric range was somewhat similar from a competitive angle, but it had the added feature that the proportion of electric to total stoves sold was continuing too low. To bring up the general sales possibilities either the power companies had to be induced to lower their rates or an electric range had to be developed that would consume much less electrical energy. Although some of the largest electrical manufacturers in the country were producing electric ranges, it remained for a relatively small company to do the necessary thorough engineering job. However, it must be said that a large power company, interested in increasing its sales of electric current, backed the investigation and design.

The engineer in charge looked upon their problem as a "cooking machine," and undertook it as a job in machine design. The main idea was to obtain first a heating unit that could be made to cook the average family meal quickly with a small consumption of current, and thus give a worthwhile talking point to break the existent sales resistance to electric stoves based on high cost of operation. The heating unit also had to be replaceable easily and cheaply when its efficiency dropped, as it always did after a period of use. New types of cone-shaped elements were designed that could be screwed into reflectors that concentrated the heat directly under the cooking container. Practically all heating elements up to that time had been the old flat type that radiated in all directions and thus lost much of the energy. The new reflectors were heavily chromium-plated in order to retain a bright reflecting surface even when exposed to heat and hot greases.

One problem after another in the stove was then worked out in painstaking detail with radical changes from hitherto accepted design standards. Out of it came an oven with rounded edges, heating elements in the center, and chromium-plated interior walls to reflect back the heat that otherwise would escape through the standard oven walls. Incidentally, another stove company at the same time hit upon the idea of reflecting back the heat waves by lining the oven with aluminum, which reflects more than 90 per cent of the waves.

Even the standard four legs that had been used since the Romans first built stoves were revamped in the "cooking machine" into a more practical and neat-appearing double pedestal. When models were built, they were put out to cooking schools where they received in a short period of continuous service even more use and abuse than they would get in years in an average home. The suggestions of the critics of the schools were also reduced to practice where possible. The redesign of this stove broke all design ideals regarding precedents and standards "that the consumer is used to and wants." The new range sold freely in the worst year of depression. But it was not able to rest long "on its laurels," because other stove designers set about to equal or better the design. One maker of gas stoves, Odin, applied the cone reflector under the gas burner with a gain in heating efficiency of 15 per cent. In this case the "heat-concentrating bowls" were of cast iron, porcelain enameled.

Engineering-Sales Analysis Applied to Automobiles

Among the automobile plants can be found many examples of engineering-sales analyses during the difficult business years, and sums ranging from $500,000 to several millions of dollars are being spent annually by individual plants on engineering alone. In this field the sales work is complicated by the fact that as soon as one company incorporates a new idea the other companies announce practically the same feature. It makes for a condition where secrecy is spread around the engineering activity until such time as a new model is to be placed on the market.

Probably one of the most outstanding examples of sales design during the early depression period, before tight money tied up the buying power of the utility companies, was that of the Yellow Coach bus of the General Motors Truck Corpn. With General Motors, as with practically all of the development work of the large automobile companies, engineering is in charge of a man on the executive staff on an equal basis with the heads of sales and production. The vice-president in charge of engineering has headquarters in the executive office, removed from the designing divisions. This is more likely to create a detached viewpoint and stimulate cooperation with all factors in the plant to obtain an eventual product wherein every facility of the plant is utilized to best advantage.

When the Yellow Coach was designed it was to meet what the sales staff believed was the crying need of the time, namely, quick, easy main-

(*Concluded on Advertising Page* 12)

Production Control Aided by Recording Instrument

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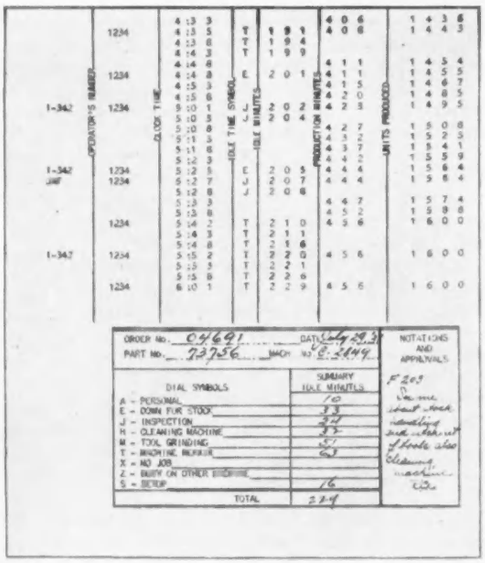
CONTROL of production machinery is the function of a mechanical recording device, largely automatic in operation, that has been developed by the National Acme Co., Cleveland. This instrument, designated the Chronolog, furnishes a constant and accurate record of the performance of the machine, both in visual form and tabulated in printed form. It may be used on practically all types of machine tools, as well as on numerous other kinds of machinery which perform operations that are subject to interruption.

The purpose of the instrument is to provide a prompt and accurate record of what is being done on each machine. It keeps a check on production by recording the rate of production. One of the outstanding advantages claimed to result from its use is that it aids in eliminating leaks in production by showing the cause and duration of all idle time and thus enables the management to reduce the time the machines are idle.

The instrument prints at fixed intervals on a chart the operator's clock time, the accumulated idle time, the accumulated production time, the total pieces produced and the cause of idle time. The clock time and accumulated idle and production time and the number of pieces produced are also indicated on register wheels where the operator may see the figures at a glance. The record as shown on these register wheels may also be printed at any time on cards for use by the time study or production department or paymaster by slipping a card into a slot in the side of the machine and bearing down on a printing lever.

The device is either mounted directly on a machine or on a pedestal at its side within convenient reach of the operator. It is operated by two switches working in synchronism, one contacting the piece that is being produced and the other contacting a shaft of the machine. However, when machines are not single-purpose tools but are doing different types of work

THIS shows (below) the front and reverse sides of the card record, or Chrono-card, that is printed as required at any time desired and sent to the payroll, production, time study and other departments that may need explicit records of progress made on the machine. The printed top line is always a reproduction of the last line on the Chronolog record.



OPERATOR'S NUMBER	CLOCK TIME	IDLE TIME SYMBOL	IDLE MINUTES	PRODUCTION MINUTES	UNITS PRODUCED
1234	4 13 3	T	1 9 1	4 0 6	1 4 3 6
	4 13 8	T	1 9 4	4 0 8	1 4 4 3
	4 14 3	T	1 9 9		
	4 14 8			4 1 1	1 4 5 4
1234	4 15 3	E	2 0 1	4 1 5	1 4 6 7
	4 15 8			4 2 0	1 4 8 5
1-342 1234	5 10 1		2 0 2	4 2 3	1 4 9 5
	5 10 3		2 0 4		
	5 10 8			4 2 7	1 5 0 8
	5 11 3			4 3 2	1 5 2 5
	5 11 8			4 3 7	1 5 4 1
	5 12 3			4 4 2	1 5 5 9
1-342 1234	5 12 7	E	2 0 5	4 4 4	1 5 6 4
JAF 1234	5 12 7	J J	2 0 7	4 4 4	1 5 6 4
	5 12 8	J	2 0 8		
	5 13 3			4 4 7	1 5 7 4
	5 13 8			4 5 2	1 5 9 8
1234	5 14 2	T	2 1 0	4 5 6	1 6 0 0
	5 14 3	T	2 1 1		
	5 14 8	T	2 1 6		
1-342 1234	5 15 2	T	2 2 0	4 5 6	1 6 0 0
	5 15 3	T	2 2 1		
	5 15 8	T	2 2 6		
1234	6 10 1	T	2 2 9	4 5 6	1 6 0 0

ORDER No. 04691 DATE 7-29-31
PART No. 73756 MACH. NO. E-2449

NOTATIONS AND APPROVALS

F 203

DIAL SYMBOLS	SUMMARY IDLE MINUTES
A - PERSONAL	10
E - DOWN FOR STOCK	31
J - INSPECTION	27
H - CLEANING MACHINE	33
M - TOOL GRINDING	51
T - MACHINE REPAIR	63
N - NO JOB	
Z - BUSY ON OTHER MACHINE	
S - SETUP	16
TOTAL	229

OUT 1234 — 6 10 A T 2 2 9 4 5 6 — 0 1 6 0 0

EMPLOYEE B.G. KETOWSKY
SHOP ORDER 04691
CUSTOMER U.S. Govt
DESCRIPTION OF PART #73756 Temporary Nose Cap
OPERATION NO. 1 RATE
OPERATION 41/2" Checking Machine
MACHINE NO. 38 SHIFT NO. 2 P.M. MACH. NO. E-2449
EMPLOYEE NO. 76
TOTAL BASE HOURS 11.4
% OPERATING 67% UNITS PRODUCED 1600
TOTAL
FOREMAN F-203
DATE 7-29-31

TO B.G.K.
DEPT. Prod.
DATE 7/29/31
STANDARD 150
ACTUAL 154
"CHRONOCARD" FOR USE WITH CHRONOLOG
GRAYBAR ELECTRIC CO. DISTRIBUTORS

IN 1234 — 6 10 4 — 0 0 . 0 0 — 0 0 0 0 0

IDLE TIME RECORD	SUMMARY OF IDLE MINUTES
A - PERSONAL	10
E - DOWN FOR STOCK	31
J - INSPECTION	27
H - CLEANING MACHINE	33
M - TOOL GRINDING	51
T - MACHINE REPAIR	63
N - NO JOB	
Z - BUSY ON OTHER MACHINE	
S - SETUP	16
TOTAL	229

IN the upper part of this illustration is the end of a Chronorecord, or record made on the Chronolog. This shows in the bottom line the operator's quitting time, idle and production minutes and total pieces produced. The letters that appear in one column are symbols for the cause of idle time. The operator's clock number is shown in the second column. In the first column appears the clock number of the foreman or other employee who has been called to the machine. After the chart is removed from the instrument a clerk rubber stamps at the bottom the form shown in the lower part of the illustration and summarizes and totals the idle time. This report, showing the causes of idle time, goes to the foreman, superintendent or manager.

and are largely manually operated, usually only one switch, operated by the cycling shaft or piece, is used.

The operator on reaching his machine in the morning inserts a key that unlocks a control switch which he then turns on. The Chronolog prints the time on the chart, registering the time the man actually reaches his machine rather than the time that he comes in the factory entrance, as is shown by an ordinary time clock. The device at the same time records on the chart the man's clock number, which is his key number, and the resetting to zero of the various indicators.

After the instrument is set it requires no attention from the operator so long as the machine is under production. When operation is uninterrupted the instrument automatically prints the record on the chart at 5, 10, 15 or 30-min. intervals, these being fixed to suit the requirements of the work. In case of interruption the operator turns a lettered dial in front of the instrument, dialing the letter that is a symbol of the reason for stopping production. At the same time his finger bears down on a printing lever, causing to be printed on the chart the time and the letter symbolizing the cause of interruption, grinding such as "no stock," "down for tool grinding" or "machine repairs," as well as the record up to that moment in other columns on the chart. Then the instrument stops adding up production and starts to add up idle minutes. The symbol letters and the reasons for interruption that they stand for are listed on the front of the instrument.

Red Light Indicates Machine Is Idle

A red signal light shows at the top of the device when the instrument has been dialed and this light remains on until the dial is returned to "production" or to normal position. This light indicates to a foreman or any other supervisor that the machine is down. In case production is interrupted for lack of stock or for other reasons when the machine is running this signal flashes intermittently. This warning signal light is duplicated in any desired remote location by means of a remote signal cord. When the operator dials for the stock, repair or set-up man, for example, the man whose services are required puts his key in a second slot in the instrument on his arrival and presses down on the print lever, which prints a line on the chart and this shows his key number as well as the chart record. Checking this with the operator's dialing shows the time that has elapsed between his dialing and the arrival of the man who has been summoned.

After dialing for any cause the instrument is automatically restored to production position as soon as production is resumed except when it is dialed to set-up position. When in the set-up position, trial pieces are being made and as these are imperfect they are not counted and for this reason the switching mechanism does not automatically restore the instrument to the production position. When the operator is ready to resume production he pushes a button which resets the dial in the production position. Should the operator fail to dial the reason in case of interruption, his neglect is revealed by a repetition of the figures on the printed record showing the number of pieces produced. When he removes his key on quitting work his stopping time is automatically recorded together with the accumulated production record.

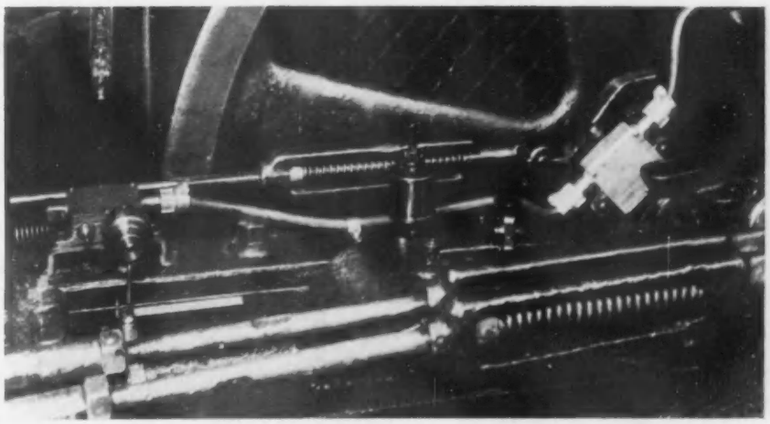
The record is printed on a roll of paper placed within the machine and is taken out at the end of the day or job by tearing off the portion containing the record. Notations may be written on the record through slots over which there is a hinged cover. The device operates on an ordinary lighting circuit.

Applications

The instrument has been successfully used on various types of ma-

(Concluded on Advertising Page 16)

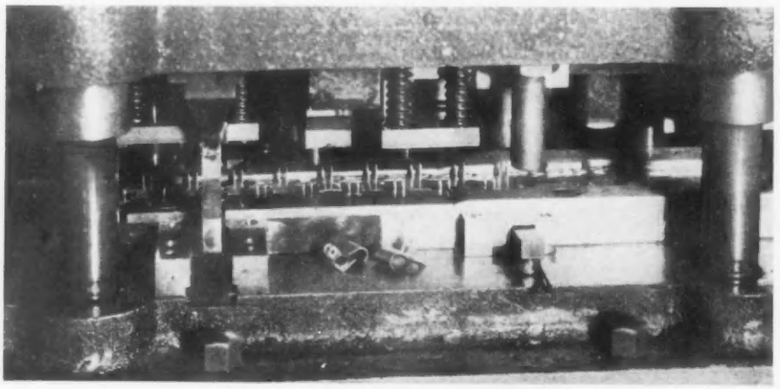
PIECES inspected with a tolerance gage are counted by a Chronolog in the National Acme plant. With a time study estimate of 350 pieces per hour, two girls inspected an average of 400 pieces per hour at the end of the first week, 500 at the end of the second week and 600 at the end of the third week. This speeding up enabled the inspectors to work shorter hours with the same pay, due to piece-time rates.

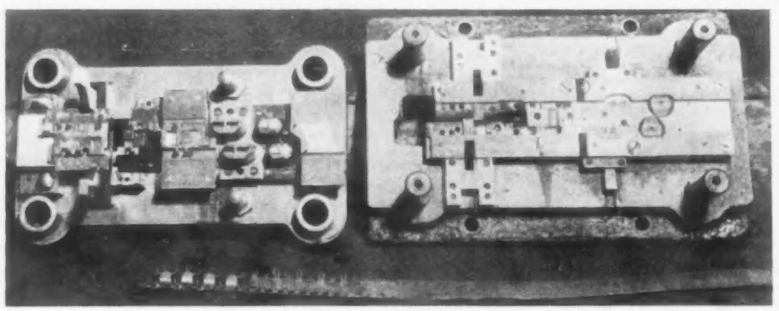


CLOSE-UP of a Manville trimmer showing the two switches for actuating the counting mechanism of the Chronolog. The oscillating switch on the left registers the count of the pieces and the switch at the right flashes the red light on and off when the feeding hopper is empty. After two days' production was recorded the charts indicated that slight adjustments to the machine were necessary and these increased the actual production on 9/16 x 2¼ in. extruded screws to 2390 pieces per hour, as compared with an estimated production of 2080 pieces per hour.

"Better Times"—

Third of a series of "Performance Pages" as selected from actual practice by The Iron Age Editors

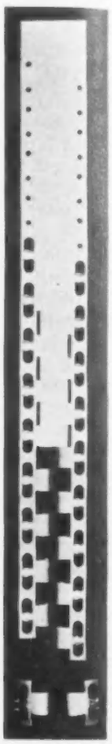




Headlight Latch and Lock Stamping; Medium High-Carbon Steel Strip

Method shown,
1 man, 1 press,
164 strokes per minute,
2 pieces per stroke
16,400 pieces per man hour

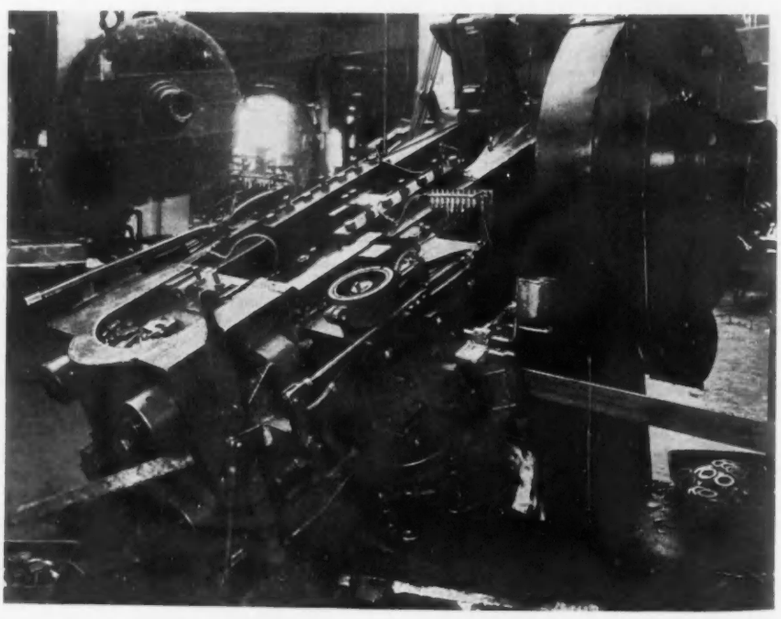
Previous method,
3 men, 3 presses
334 pieces per man hour



Ball Bearing Race Ring; High-Carbon Steel

Method shown, 1 man, 1 press,
60 strokes per minute
3000 pieces per man hour

Previous method, 3 men, 2 presses,
334 pieces per man hour



PRODUCTS: Stampings and formed metal parts

OPERATIONS: Piercing, blanking and forming

PRODUCTION EQUIPMENT: E. W. Bliss Co. automatic speed presses and forming machines

▲▲▲

RECENT developments in automatic press operation have increased production per man on some special stampings by fifty times. The examples shown here are taken from actual present-day operating practice, and the rate comparison is with good practice immediately preceding the introduction of the new method. This is the third of the new IRON AGE "Better Times" series. Succeeding issues will give examples of actual practice with a wide diversity of equipment and product.

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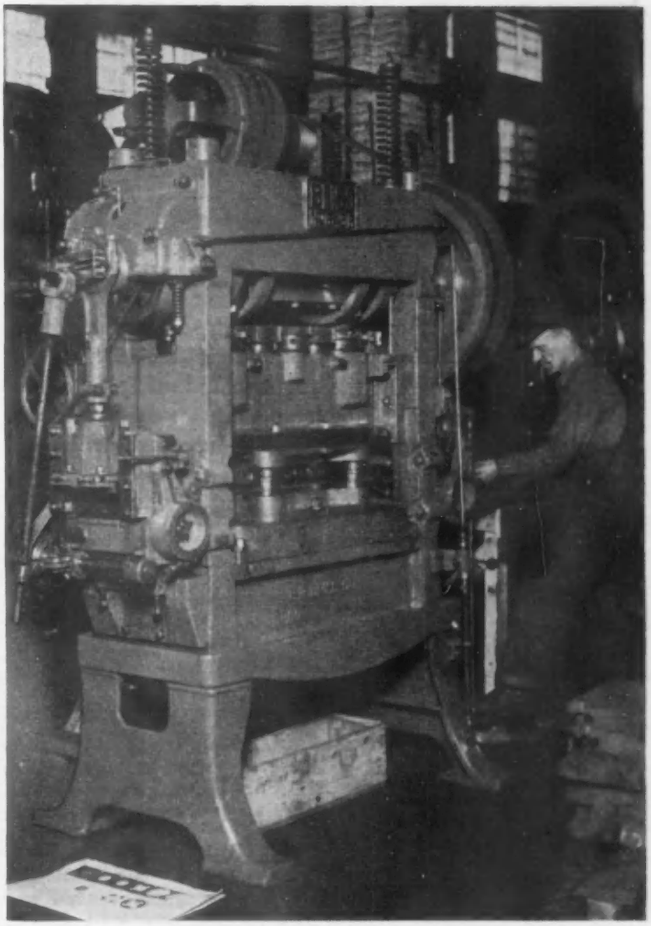
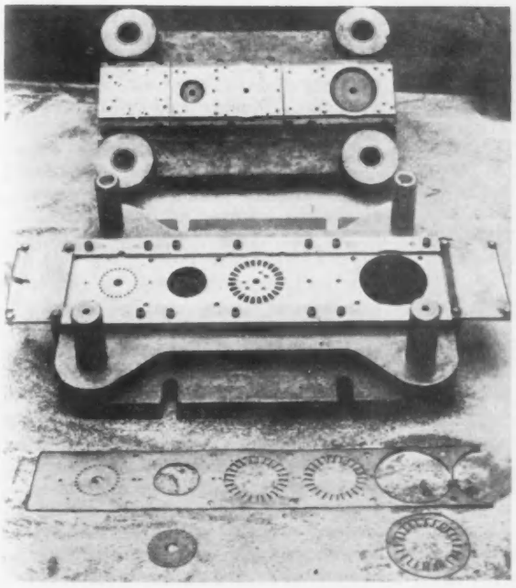
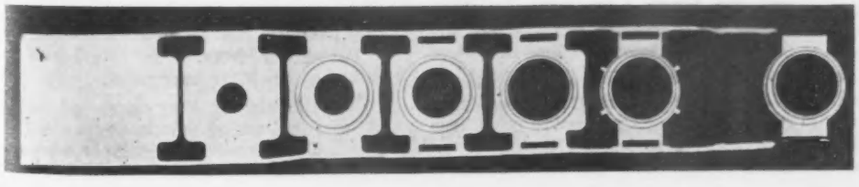




Small Rotor and Stator Laminations; Mild Steel Strip

Method shown, 1 man, 1 press,
180 strokes per minute,
2 pieces per stroke
18,000 pieces per man hour

Previous method, 2 men, 2 presses
3000 pieces per man hour



Speedometer Bezel; Coiled Brass Strip

Method shown, 1 man, 1 press,
200 strokes per minute
10,000 pieces per man hour

Previous method,
3 men, 3 presses
2000 pieces per man hour

W. S. PILLING

PIG IRON—Primary Material in Prospect and in Retrospect

By W. S. PILLING

CONSIDERABLE attention is being focused on the depression ills and future problems of the steel business, the "forgotten industry." But what of the outlook for the pig iron industry, its even more obscured progenitor? What will be the trend of future consumptive demand? What changes will eventuate in the ranks of merchant and steel company units during the coming decade?

These and other related questions are succinctly dealt with by Mr. Pilling, who prior to his retirement last year was "dean" of the Eastern pig iron trade. His background of 60 years as a producer and seller of pig iron affords an unusually clear perspective with which to view the industry's future.

IT is needless to point out that any prophecy at this time is more than ordinarily hazardous. While we have been trained to believe that history will repeat itself, changing conditions would seem to indicate that this rule will be much modified from our present standpoint.

Reference to the old files of THE IRON AGE will show that during the early part of the years 1901, 1911 and 1921 charts prepared by me were printed indicating the production of pig iron, both in tons and per capita of population, during the preceding decades. Beginning with the year 1860, each decade showed a general and high increase of production. During some of these decades, the production more than doubled. Sometimes the increase did not happen to strike the exact end of the ten years' period, but in a general way the growth during each decade was from 50 to 100 per cent. The high point of production was reached in the year 1929 with a total of nearly 42,000,000 tons.

A far more remarkable fact, however, is shown by the figures representing the per capita consumption of the United States. This rose from 60 lb. in 1860 to 782 lb. per capita in 1920, but dropped in 1930 to 566 lb. The large increase in production during the decade succeeding 1920 occurred in the year 1929 and, while not showing as much increase as during previous years, indicated that the rule of progression was still in force. I doubt, however, whether any stretch of the imagination could lead any thoughtful student to believe that the year 1940 will show a corresponding increase. There are probably two good reasons for my belief on this point.

Decline in Population Growth and Railroad Expansion

In the first place, the population of the United States will increase much less rapidly during the present decade than in any during our past history. Some time ago I read a thoughtful article in one of the magazines which indicated, from the author's calculations, that the population of the United States in the year 2000 would be only 150,000,000, the estimate being based upon various conditions, especially reduction of immigration and the lower birth rate. I think his figure is entirely too low, but believe that the general trend is toward a slowing up of population growth.

Another fact is that the great railroad systems of the country have been practically completed, although maintenance and laterals will still be a great factor in iron consumption, as will also be the gradual replacements of tracks and bridges by heavier material. We must also bear in mind that each replacement is largely offset by a large tonnage of scrap. In spite of this, however, it is quite certain that each decade will show, perhaps irregularly, a marked increase in consumption of iron and steel. I doubt whether changing processes, such as electric furnaces, stampings, forgings, etc., will have any great influence on the consumption of foundry iron—not enough to be an important factor.

Merchant Capacity Not Likely to Increase

I doubt whether, unless under very exceptional conditions, there will be any sustained effort to increase the capacity of strictly merchant pig iron furnaces. I think the most favored ones will continue to be a factor, but to a decreasing extent. The enormous cost of construction of modern blast furnaces is not likely to induce capital to venture into the merchant field. Large steel plants, owing to fierce competition, must modernize or construct blast furnaces to produce pig iron at lowest cost. These furnaces are also receiving considerable credit, due to the utilization of gas and other by-products, which give them a still greater advantage over the strictly merchant furnace.

The merchant trade, although less important than consumption for steel, adds to the total tonnage and reduces overheads of steel producers, and with modern practice it is comparatively easy to switch grades and qualities to accommodate requirements for castings. The small rolling mills requiring iron are practically extinct. It is not likely that steel producers who have gone to the expense of building up a merchant trade will relinquish this business merely because there is a temporary demand for steel sufficient to tax their capacities.

My thought is that some of the present makers of merchant iron will retain their trade, particularly where they have a reputation for specialties,

but the old-fashioned uneconomical furnace, unless possessing local advantages, will probably have to drop out or operate only spasmodically. It is quite natural that during the present depression steel makers producing pig iron would make and pile steel grades knowing that ultimately they will be utilized. The piling of foundry grades is much more troublesome, as the various analyses must be piled separately and any large tonnage involves complicated records and uneconomical piling and rehandling, which is not to much extent the case with steel grades.

What History Teaches

Past history does not seem to interest nor to be seriously considered by the present generation. The long vista does not seem to count for much. When depressions occur the gloomy view is taken that the end of prosperity has been reached and may never come again. Then something happens, and every producer becomes buoyant and instead of putting handsome profits into banks or securities invests them largely in bricks and mortar and enormously expensive physical plants, which are not assets after profits disappear and interest on bonds become payable. The present array of wrecks on the sites of previously prosperous plants and mines illustrates the truth of this comment, and I suppose that these cycles of profits and mistakes will continue as long as the world lasts. It is a pity that wisdom cannot be acquired by observation, but only by experience, much of which is sad.

Hardening of Special Cast Irons By Development of Martensite

DEMAND for cast irons that are machineable and at the same time possess great hardness in their finished state led L. Guillet, J. Galibourg and M. Ballay (*Revue de Metallurgie*, November, 1931) to study the influence of quenching on the physical properties and structures of special cast iron compounded in crucibles. Machining qualities eliminate white and mottled iron castings, so that gray iron is the essential starting point, the aim being to improve machineability by causing combined carbon to be converted so as to appear in the form of sorbite or martensite.

Additions of nickel tend to cause the carbon to appear as martensite rather than as pearlite in the original casting, giving considerable hardness, but above 300 Brinell the material becomes difficult to handle, as it is very sensitive to the amount of addition. Resort may then be made to quenching followed by tempering. With ordinary gray iron very drastic quenching is required, which results in porosity.

Alloying elements are available to decrease the quenching temperature and rate of cooling necessary, reducing the danger of internal fissures. Air-hardening compositions may be machined after preliminary tempering at 1200 deg. F., hardening being readily accomplished by air-cooling from 1560 deg. Martensite material in the as-cast condition may be tempered to the desired hardness uniformly in the thick and thin sections.

Study of the influence of different elements on martensitic quenches of many specimens showed that silicon raised the transformation temperature and increased the critical cooling rate, diminished the tendency toward martensite, and caused graphitization; that between 0.2 and 0.65 per cent manganese slightly lowered the transformation point and distinctly reduced the critical quenching rate, influencing the hardness, especially after the secondary quench, without much effect after the primary quench. Nickel lowered the transformation as low as 660 deg. F., reduced the critical cooling rate, favored secondary rather than primary hardening, and facilitated graphitization. Chromium with nickel reduces the critical rate of quench, favors secondary hardness, and increases the depth of martensitic quench.

The hardness developed by quenching various compositions from different temperatures in oil is shown in the accompanying selected data.

As the nickel content is increased the quenching temperature for maximum hardness is reduced. Phosphorus had practically no influence.

Tests showed that while quenching affected unfavorably properties other than hardness, these, like the hardness, were improved after tempering. The improvement was as much as 30 per cent in hardness, 50 per cent in resistance to shear and 10 per cent in bending strength, compared with the as-cast condition.

In choosing the composition of a cast iron for martensitic quenching it is necessary that the iron be gray, thus imposing certain minimum values for the total carbon and the silicon contents as determined by the size of casting. Then to produce the hardening result nickel is added, and the silicon figure can be reduced by 40 per cent of the amount of nickel to produce the same graphitizing tendency. If chromium is used its anti-graphitizing effect will account for three times its percentage of nickel.

The quantity of nickel required depends on the admissible quenching rate, which is determined by the thickness and shape of the casting. Thus a composition for oil-quench from about 1500 deg. for 13/16-in. thick pieces is 3.2 per cent C; 1.0 Mn; 1 to 1.5 Si; and 1.5 to 2 Ni. For air-quenching there should be 4 to 5 per cent nickel, and the proportion of this element should be relatively high in pieces to be obtained hard after sand casting. About 1 per cent each of manganese and silicon are generally required.

On account of the weakness of the material, special attention must be paid to avoid internal fissures by regulating the rate of cooling. Complicated shapes may be reheated before they have cooled below 400 deg. F., and frequently the composition must be regulated so as to demand a relatively slow critical cooling rate. While repeated quenching is to be avoided, tests showed that the properties were little influenced by a second quench.

Cast irons susceptible to heat treatment have been developed too recently for the applications to be numerous, but they should be useful in the construction of cylinders of internal combustion engines, gears and other parts operating under severe conditions. Since the cost of casting and machining is more important than the material involved, the more expensive ingredients should be no drawback in view of the improved wearing qualities.

Hardness Developed by Quenching Various Compositions

Composition, Per Cent						Brinell Hardness After Quenching from Deg. F.						
C	Mn	Si	Ni	P	S	As Cast	1290	1380	1470	1560	1650	1740
3.4	0.57	2.0	0.0	0.37	0.06	182	...	178	174	226	...	313
3.1	0.60	1.5	1.1	0.37	0.06	188	...	176	265	325	389	...
3.4	1.1	1.8	3.3	0.19	0.06	269	238	389	434	365	342	371
3.1	0.9	1.7	5.1	0.08	0.04	332	386	371	347	322	313	...

The Tariff Commission has issued a report entitled "Bases of Value for Assessment of Ad Valorem Duties in Foreign Countries." This compilation compares the provisions of law in 48 foreign countries, describing the method or basis of valuation to be used in applying ad valorem rates of duty to imported merchandise dutiable according to value.

Spot Welding the Rustless Steels

By V. W. WHITMER
Metallurgist, Republic Steel Corpn.

RUSTLESS steels are particularly well adapted to spot welding because of their clean surface, freedom from any oxide or scale, and because of the absence of any coating such as zinc or lead, as on galvanized or terne plate stock.

Spot welding, in principle, is nothing more than holding two sheets in close contact between two copper electrodes about an inch or so in diameter with the contact ends tapered to about ⅛ in. in diameter, and passing a current low in voltage but high in amperage through the circuit for a short period. Fusion immediately takes place between the two sheets, while the excess heat is rapidly carried away from the outside surfaces by the water-cooled electrodes. The low voltage, about 2 to 4 volts, is obtained from a step-down transformer wound in sections, each being connected with a stop on a rotary control switch by which the current or heat can be increased or decreased by turning up or down respectively.

Success Depends on Four Variables

While the total heat applied will be determined by the rotary adjustment, the area of the electrode points should be maintained as near constant as possible. Any increase in area will tend to reduce the heat per unit area, resulting in an improperly or poorly fused joint. A decrease in area will increase the unit heat and will usually burn a hole entirely or partly through the sheet to be welded, other factors remaining constant.

The pressure exerted by the electrodes is generally produced by the compression of helical springs and can be adjusted by a lock nut on a shaft through the center of the spring. Variable pressures will also affect the quality of the weld. Too much pressure will reduce the resistance of the joint and hence tend to decrease the heat generated. The pressure generally determines the amount of upset displacement directly following the fusing period, producing an indentation on each side of the sheets welded.

In addition to these variables, the time of current flow is of great importance. Too long a period gives the same result as too much heat. Too short a contact will produce no weld.

It is evident, therefore, that spot welding depends on the following four variables:

1. Current (controlled by rotary switch).
2. Diameter of electrode contact points.
3. Pressure (controlled by spring or pneumatic pressure).
4. Length of time the current is allowed to flow.

Less Heat Required for Rustless Steels

While it would not be impossible to determine an adjustment of each of these with respect to the other for each gage to be welded, as in the case of automatic machines where time and pressure are accurately controlled by motor-driven cams and the current set by hand, it would be next to impossible to determine them for manual operation, due to the personal element. Furthermore, such adjustment would be necessary for each individual machine. This makes it impossible to set up any specific procedure to follow for this class of work. However, rustless steel, such as Enduro, in general will require less heat than the same gage in common steel, due to its lower heat conductivity (tending to concentrate it in one spot), its lower melting point and better contact due to a scale-free surface. Consequently, if an operator is producing good work on say 20-gage black steel, he could, in general, change to the same gage of rustless by either dropping the switch one point or reducing the time slightly, or both. More definite instructions cannot be given but the exact procedure must be worked out individually, balancing one variable against the other until the desired result is obtained.

Welds Should Be Placed in Inconspicuous Positions

If both electrodes are of the same diameter, a depression will occur on both sides which, while not serious on the pickle finishes, may be objectionable on the polished surfaces. This can be reduced by using a copper block about ½ in. thick and 2 in. square between the electrode and polished side, thus putting the major depression on the lower side. An aluminum block ⅛ in. to ¼ in. works even better, but due to its lower melting point will tend to pit if a slight arc is drawn. This procedure will reduce the depression but will not eliminate it entirely, as it is due to shrinkage of the molten metal in the center and, hence, pulls from both surfaces. The indentation remaining, if the work is to be polished, will have to be ground out with a cotton wheel set up with glue and abrasive. (Use about 80 grit or finer.)

When welding polished rustless steel, it is advisable to place the welds at the least conspicuous positions, as often it is difficult to refinish the welds and have the same color if the whole piece is not refinished. This depends, however, to a great extent, upon the finish of the sheets.

Spot welding, like any other type of welding requiring high temperature, will form an oxide on the surface which will be blue in color. If this is exposed to the weather or moist conditions, it will slowly change to a brown color resembling rust. This, however, is only a surface condition, affecting the original oxide only. If such welds are to be exposed to the atmosphere, they should be cleaned either with acid, as in pickling in the case of No. 1 finish sheet, or ground and polished if No. 4 or higher finishes are employed. In the ground and polished state, spot welds are just as resistant to the salt spray as the original metal.

Color Inlays in Micarta

BEAUTIFUL inlays in colors are now available in micarta finishing materials, according to an announcement made by the Westinghouse Electric & Mfg. Co.

Striking color effects can be obtained, according to the announcement. A controlled dyeing process makes available hundreds of colors in any desired variation of hue, value and chroma. Typical examples of the possible combinations are ebony black and silver, wine red and golden yellow, and moss green and autumn brown.

The designs are stamped or cut out and are incorporated into the micarta in the manufacturing process.

Micarta consists of a half dozen or more sheets of paper or cotton fibre, treated with phenolic resins, and subjected to great pressure and high temperature. The decorative effect and color designs appear in the top sheet of the uncured micarta. During the curing process, the resins flow throughout, resulting in a homogeneous mass of material. However, the designs and colors remain clear and distinct. Tests show that the colors are "fast" under the most severe conditions.

Production of dredging, excavating and road-building machinery in the United States in 1931, according to preliminary report of the Bureau of the Census, amounted to $47,508,766, compared with $91,438,554 in 1929.

In the interest of economy, the Tariff Commission has discontinued publication in Commerce Reports of the full text of notices regarding investigations. Simple announcements will, however, be carried in that publication.

Liquid Baths for Heat Treating—Advantages and Disadvantages of Salt Baths

By W. PAUL EDDY, JR.
Metallurgist, General Motors Truck Corpn., Pontiac, Mich.

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THIS is the third in a series of articles on liquid baths for heat treating. In it the author takes up the broad subject of salt baths. There is a comparison of salt baths with oven furnaces and of salt with lead baths. The ideal salt bath should be inert to the metal heated therein, should not change its composition or form a sludge, should not fume corrosively nor pit or corrode the container. An ideal salt bath, however, has not yet been discovered, he states. Subsequent articles will take up the low, medium and high temperature mixtures into which classes he divides salt baths. In THE IRON AGE for Sept. 1 and 15 baths of oil and lead, and of cyanides were respectively dealt with.

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BY the term "salt bath" is usually meant a bath, composed of one or more salts, designed to form a heating medium inert to the work. It imparts neither a hard nor a soft surface to steel, but turns out work having the same chemical composition from surface to interior as it had before heating.

Salt Baths in General

VIEWED in this light, it becomes evident that a salt bath does not impart certain mysterious, beneficial properties to metals heated therein, as has been claimed, and that, to be really desirable, it should be a heating medium and nothing else.

The value and ecoromy of a salt bath depend upon its application to suitable jobs and upon its use within the limits of temperature at which the salt mixture operates at highest efficiency. These two considerations are vital. Many heat treaters have become mentally "set" against salt baths because they had believed the extravagant claims made for a salt mixture, concerning the wide variety of work which could be best handled in that bath, or the wide temperature range throughout which the bath operated perfectly, or the perpetual inertness of the bath. Salt baths are no panacea, and every mixture has fairly definite limitations as to temperature which are in many cases rather narrow.

Salt Baths vs. Oven Furnaces

Let us compare, in general, the characteristics of salt baths with those of oven furnaces:

(1) The bath tends to heat work more uniformly than do most ovens, for two reasons: Work is ordinarily suspended in a bath, but is usually laid on the hearth in an oven; and the nature of a bath naturally eliminates contact of cold air with the work, whereas many oven furnaces are not air-tight. If an oven furnace be absolutely air-tight (a perfect muffle), and if the work be suspended therein, or otherwise arranged so that heat absorption is equal on all surfaces, there is no reason why the heating will not be as uniform as in any salt bath.

(2) Salt baths, if properly maintained and operated, eliminate scaling. This is unquestionably an advantage of salt baths over any air furnace when operating at scaling temperatures. Salt adhering to work removed from a bath also helps to prevent scaling while cooling or during transfer to the quenching medium.

(3) Salt baths, as here considered, do not carburize, but tend to decarburize steel. It is possible to obtain salt baths which, if used properly, decarburize so slightly that the soft skin cannot be detected after quenching, but the applications producing such results are limited. This point will be discussed in greater detail later.

(4) Salts heat more rapidly than do air furnaces. This may be either an advantage or a disadvantage, depending on the application. The rapid heating, together with the proximity of the heating medium and the atmosphere, makes salts usually more desirable for local heating.

(5) The salts themselves and the pots containing them are items of expense not encountered in oven furnace operation.

(6) Salts carried over with work to a quenching bath may change the composition of the quenching medium. This does not occur with mineral oil, but may happen to water or any liquid in which the salts in question are soluble.

(7) Work must be dry and preferably slightly preheated before immersing in a salt bath. The former is not essential when heating in an air furnace.

(8) Salts flux with many if not all refractories at high temperatures. This means that furnace maintenance may be more costly if salt baths are used.

(9) Radiation losses from a salt bath furnace are higher than from a closed oven furnace.

(10) The question of warping and cracking of work heat treated in a salt bath is one which cannot be answered in a word. In some cases, where the work is preheated and, due to its nature, may be heated more uniformly in a salt bath, warping and cracking may be less with a bath than with an oven. On the other hand, where slower heating is desirable, a well-designed oven furnace may yield less warping and cracking than will the best salt bath ever put together.

(11) I suppose I must say something concerning temperature uniformity, though the comparison is somewhat analagous to that between electric and fuel-fired furnaces. A suitable salt bath in a modern, well-designed furnace has, no doubt, more uniform temperature throughout than does a decrepit oven furnace which was not properly built when new. And a first-class oven furnace will be more uniform throughout its heating chamber than a makeshift salt bath furnace containing an im-

(Concluded on Advertising Page 14)

Telescoping Electric Truck Handles Dies Weighing 4½ Tons

THE 4½-ton dies used in forming caskets at the plant of the Belmont Casket Mfg. Co., Bellaire, Ohio, are handled to and from the presses and die storage racks in a 10,000-lb. capacity electric truck recently built by the Elwell-Parker Electric Co., Cleveland. This unit is believed to have the largest capacity of any telescoping type truck ever built and to be the first truck of its type to be provided with a die pulling winch.

A problem in designing the truck was to provide a unit that would carry its load through 7-ft. 6-in. high doorways and beneath low piping, and to have a lift of 106 in. or 18 in. higher than the overall height of the truck when passing through the doorways.

When removing a die the truck is spotted in front of the press and the cantilever platform is elevated to the level of the press bed. Then the two cables with hooks located half way of the height of the uprights are led out under the sheaves at the bottom of the uprights and attached to the die. A winch on the truck winds in the cables, thus drawing the die on to the truck platform. The platform is then lowered and the dies transported to the die storage.

The storage rack is built of 8-in. structural steel H-sections. In order to reach the top or fourth bin of the rack the platform must be raised to its maximum height. The elevation of the platform is effected through a set of inner uprights rolling on special tracks inside the structural members. Before elevating the platform with its load the two winch cables are passed around the two sheaves at the forward end of the platform and hooked to the back of the die. The load is then elevated, the winch motor started and as the cables are wound in the die is slid forward from the platform to its storage berth on the die rack. The operations are reversed for removing the die from the rack and taking it to the press.

The truck is battery powered with motor-operated worm drive axle, motor-operated ie puller and motor-elevated platform. It is equipped with limit switches, automatic cable tension control, hand-wheel steering of the six wheels and automatic control of brake and power through interlock by independent operation of the brake and power for ramp operation and free wheeling on the level. Its minimum lift is 11 in. The overall height is 88 in.

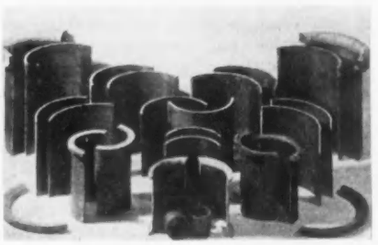
Tiering truck of 10,000-lb. capacity equipped with die pulling winch.

Ryertex Bearing Made from Synthetic Resin

A NEW bearing designated as the Reyertex, made from synthetic resin with a strong textile material as the base, has been placed on the market by Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago.

The textile reinforces the resinoid, which completely fills and saturates the base material. The composite material is subjected to heat and pressure under dies, which not only set the material, but form the bearings to exact type and size. The product sets at a pressure of approximately 1 ton per sq. in. and a temperature of 340 deg. F. After manufacture the bearing is no longer fusible or soluble. It cannot be resoftened by heat, will not absorb water or oil and is resistant to most acids. It is, however, attacked by hot caustic alkalies.

Ryertex bearings are extremely hard, and savings through greater length of service and decreased power consumption are claimed. They are said to be particularly satisfactory



where it is easier to apply water than oil as a lubricant, although they also operate satisfactorily with oil. Steel mill test applications include roll neck and roll table bearings in rod, strip, bar, structural, plate and blooming mills, in which uses the bearings are said to have proved entirely satisfactory, with indications of substantial savings. Bearings from the smallest size up to 32 in. outside diameter are made.

New Welding Head Uses Heavily-Coated Wire

AN automatic welding head designed to use heavily coated electrodes has been introduced by the General Electric Co., Schenectady. This unit, designed to carry automatic welding into the field of high-quality, high-speed welds, is said to be suitable not only for the manufacture of Class I pressure vessels, but for the rapid production welding of other products requiring welds of high quality. The standard head has capacity for heavily coated electrodes up to 5/16 in. in diameter and is rated up to 600 amp. Modification of its design can be made for larger electrodes and heavier welding currents. A wide range of plate thicknesses can be welded by making several passes.

Hardened Gears Finished Rapidly on New Automatic Lapping Machine

By D. T. HAMILTON
Fellows Gear Shaper Co.,
Springfield, Vt.

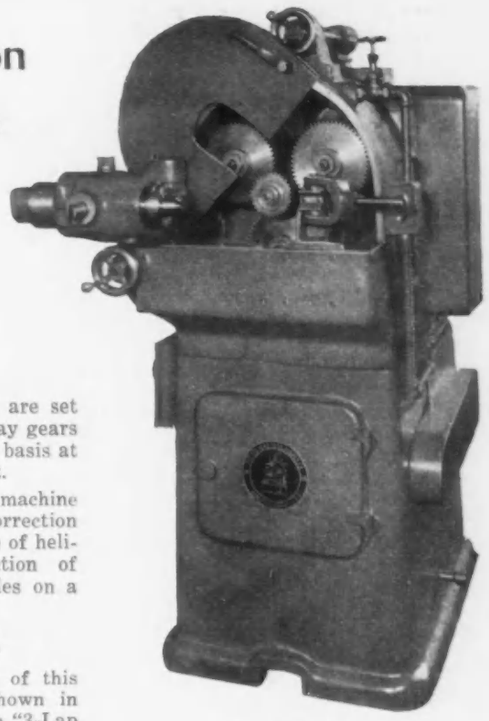


FIG. 1

THE Fellows Gear Shaper Co. has developed a new method of finishing gears by lapping after hardening. This process, in addition to smoothing the contacting profiles of the teeth, also removes slight distortions resulting from heat treatment, thus producing more accurate, efficient, longer lived, and quieter operating gears.

Extensive tests have demonstrated conclusively that with all other factors remaining constant, the smoother the finish on the teeth, the nearer the approach to silence in operation, either running idle or under load. It has also been demonstrated that smoothness of contacting profiles has a direct effect on increased gear life.

The improvement made possible by lapping is particularly noticeable on helical gears. In the majority of cases the gears can be lapped in a few minutes. Furthermore, as the machine developed for this work is automatic in operation, each gear is lapped for a definite period and so consistent results are not dependent upon the skill of the operator. In practice all gears receive the same amount of lapping; they are then tested on speeders for quietness and bearing, and those which do not pass inspection are set aside and relapped. In this way gears can be lapped on a production basis at a comparatively low unit cost.

Outstanding features of the machine are: Rapidity of lapping, correction of tooth shape and helix angle of helical gears, and the production of smoothly finished tooth profiles on a high production basis.

Principle of Operation

The principle of operation of this gear lapping machine, as shown in Fig. 1, which is known as the "3-Lap Recess Type," differs entirely from that of rotating gears with lapping compound introduced between the teeth. Its success does not depend simply upon the rotation of the work and the laps to effect the lapping action. It affords, in addition, a reciprocating movement of the work at a fairly high rate of speed. This effects an adequate distribution of the lapping compound over the contacting teeth, and results in much more efficient and rapid lapping action. The spindle which carries the work is driven positively through change gears, and the three laps are rotated by the action of the work. Independent and adjustable friction brakes, shown in Fig. 2, are applied to each of the three lap spindles so that the pressure of the laps on the work can be varied to suit conditions.

Since the work affords the only positive drive for the laps, and since the free rotation of the laps is restrained by friction brakes, it is evident that the contacting pressure of the laps will be equally distributed, thereby equalizing the lapping action. Distribution of the lapping compound, and hence its efficient lapping action, is facilitated by imparting a reciprocating motion to the work. The drive for this reciprocating motion and the drive for the rotary motion of the work are independent of each other, so that the rotative speed and number of strokes can be varied to suit the number of teeth in the gear being lapped. The length of the stroke can also be varied to suit conditions.

In order to change the pitch line contact of the three laps on the work,

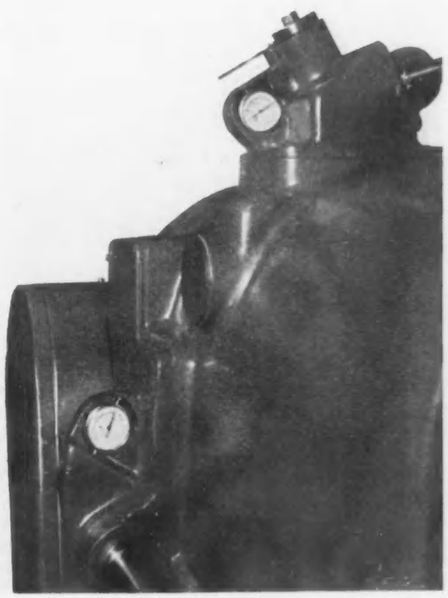
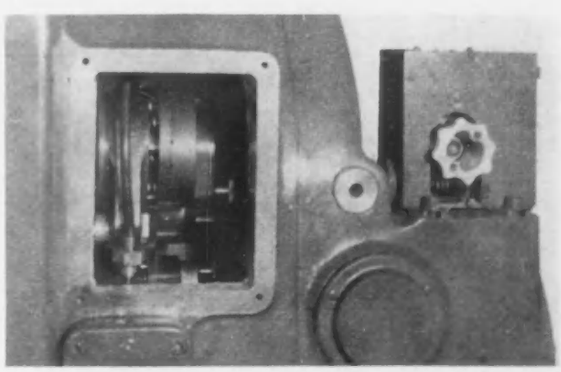


Fig. 2 (at right).—Lap spindles have independent and adjustable brakes. The limit switch automatically controls the number of work revolutions.

Fig. 3 (at left).—Dial indicators are applied to the two upper lap spindles to permit settings to correct distorted helical teeth.



each lap can be made with a different number of teeth. The center distances of the work spindle and the three lap spindles are not adjustable, but through an independent mechanism the two upper lap spindles, which are mounted on self-alining ball bearings, can be set at a slight angle with relation to the axis of the work (see Fig. 3). This permits correction of slight errors in the axial relationship of the teeth, resulting from distortions in heat treatment, and will be found especially advantageous in lapping helical gears.

Operation is entirely automatic, with the exception of inserting and removing the work, and this is accomplished electrically through the medium of a limit switch, shown to the right in Fig. 2. The limit switch can be set to any one of eight predetermined number of revolutions of the work in both directions, upon the completion of which the machine stops automatically.

Cast-Iron Laps Employed

Spur gear laps are employed for lapping spur gears, and helical laps for helical and herringbone gears. The machine is particularly adapted to the lapping of shoulder gears and gears having a recess at the end of the teeth.

Laps for use on this machine are usually made of cast iron. Success of the process is also dependent on the lapping compound used, as well as the oil in which this compound is suspended. Best results are obtained by using a compound of 320 to 400 grit, and an oil should be used which will keep this compound in suspension.

The finish on the work and the time required for lapping is controlled by three factors: Amount of lapping necessary to remove inaccuracies; lapping compound used, and rotative and reciprocating speeds employed.

For the average gear it is best to employ a comparatively slow rotative speed and a high reciprocative speed with a comparatively short stroke. For a 26-tooth gear of ¾-in. face, the reciprocating stroke should not exceed ¼ in. (this, of course, being governed somewhat by the design of the gear), about 400 strokes per min., and a rotative speed of 200 surface ft. per min. at the pitch line. Average lapping time ranges from 1 to 4 min.

A 2-hp. 1200-r.p.m. motor mounted in the base drives the machine through a single pulley, and operates both the rotative and reciprocating mechanisms; also the lubricating pump and electric limit switch. A ½-hp. 1800-r.p.m. motor in the opposite side of the base drives the compound pump. This pump has an agitator to keep the compound mixed when the machine is in operation. A by-pass is introduced in the line to regulate the amount of compound pumped to the work, so that the pump can work at full capacity and the flow of the compound on the work restricted to suit requirements.

Readjustment of Steel Industry to Quality Basis Predicted

READJUSTMENT of the steel industry to quality instead of quantity production is inevitable, Frank A. Sisco, editor of the Iron Alloys Committee of the Engineering Foundation, declared in making public a report of three years of progress on the committee's five-year program of research. More than sixty corporations and scientific organizations in the United States, and the scientific academies of three European nations are cooperating with the foundation in a world survey for which a fund of $230,000 has been raised.

"Our researches make it apparent that the steel industry has hardly scratched the surface in research and development, in spite of indications that the demand for cheap steel is gradually leveling off, showing that we are approaching a saturation point in that phase of the industry," said Mr. Sisco. "The future of the steel industry lies in a turn to quality production rather than the quantity production of the past, and tremendous improvements and extensions in the manufacture and use of high quality alloy steels should be forthcoming within the next few years.

"The manner in which the big steel companies are cooperating with us in our program of iron alloy research and the interest they are showing in our work indicate that the leaders of the industry are alive to the situation and are preparing to meet the problems of readjustment which are coming up.

"The Iron Alloys Research Committee of the Engineering Foundation originally embarked on a five-year program of research, but present trends in the steel industry seem to promise the work such great importance that we will have to carry it on indefinitely.

"We are compiling critically all the valuable research work on iron alloys ever done in the world, leaving out all that has no value to the future worker in the field," Mr. Sisco added. "We are acting as consultants to the steel industry, suggesting new lines of research and supplying data for future developments in manufacture. We also function as a sort of court, to determine whether or not any given piece of research work has practical value.

"Our publication schedule calls for three monographs in the next twelve months. The proofs of the first one are in my hands now. It is a study of iron-molybdenum, prepared by J. L. Gregg, of Battelle Memorial Institute, as part of the institute's contribution to our work. This monograph will be a considerable contribution to scientific knowledge of iron alloys. It contains data on all the research work that has ever been accomplished on alloys of iron and steel with molybdenum.

"The molybdenum group of alloys is of great importance industrially because of the strategic value of molybdenum. Practically all the molybdenum in the world is found within the borders of the United States, which means that in time of war we would not be dependent on imports for alloy steels necessary for the manufacture of war materials.

"Twenty-five years ago molybdenum was so rare that it was as costly as gold or platinum, but the discovery of our large deposits of the metal opened up industrial uses for it. Fifteen years ago it began to become important as a steel alloy. Previously all the easily welded steels had been comparatively weak, but steel research workers found that an alloy of molybdenum and steel was easy to weld, while retaining all the strength of other steels. Airplane manufacturers found they could make stronger, lighter planes by using molybdenum steel tubing for framework, a discovery which made today's high speed airplanes possible."

European Steel Entente May Be Reconstituted

WASHINGTON, Sept. 27.—There is increasing indication that the Continental Steel Entente, whose five and one-half-year life ended March 31 through failure of the membership to vote its extension, is to be reconstituted, according to the Iron and Steel Division, Department of Commerce. Current press reports denote a more conciliatory attitude of the Belgian industry. Its previously unyielding stand is reported to have been somewhat modified of late in deference to the wishes of certain Belgian banks which have been financing the industry during recent months.

Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago, has been awarded sub-contract for lock and gate operating machinery for dam No. 15 on the Mississippi River at Rock Island, Ill. Collier Construction Co., Cleveland, is general contractor and Williams & White, Moline, Ill., are sub-contractors for structural work and machinery.

Business Making Full Seasonal Improvement for First Time in Three Years

By DR. LIONEL D. EDIE

IT appears to be statistically accurate to say that general business is making a full seasonal improvement this autumn and that this achievement is recorded for the first time since the depression started.

Although there is ground for satisfaction in this performance, nevertheless the performance falls considerably short of some of the very glowing pictures of recovery which are being painted for popular consumption.

There has been a more than seasonal pick-up in production in certain lines of goods, particularly textiles.

As yet, there is no evidence that consumer buying of these goods has also been sharply above a seasonal advance. In retail trade circles expectations of consumer buying run along very cautious lines. Such circles feel that the buying power of the public has been reduced to such a low point that a sudden spurt of new buying faces drastic limitations. There may be a substantial amount of distress merchandise in the textile markets before the end of the year. The test of these markets has yet to be made. There is good reason for believing that a substantial part of the autumn improvement in the textile business represents a net gain which will carry into the spring of next year, but it is doubtful whether all of the improvement is healthy and enduring.

Outside of textiles and certain other consumer lines, the indexes of recovery are such as to suggest a rather full seasonal pick-up in September and October, but they do not suggest a major advance into instantaneous recovery all along the line.

It is well for the layman to realize that the statistical indexes which are commonly employed contain a great deal of mathematical juggling under the disguise of adjustment for seasonal. This tinkering with the original figures gives rise to a very cautious interpretation of final indexes by people who are at all sophisticated in these matters. After making allowance for the loose arithmetic which underlies most seasonal adjustments, I feel that one is warranted in calling the autumn movement a full seasonal improvement, but I find no evidence which would warrant calling it more than that.

This conservative interpretation is not in the least disappointing to those who are inclined to take a realistic view of things. It means that the process of everlastingly sliding down hill has come to an end, that the great momentum of depression is halted, and that business at large is moving sideways and probably making a horizontal base line for the depression.

Just when the big and unmistakable recovery will take place is a matter of some difference of opinion. The writer would be inclined to set up as a working hypothesis the proposition that a natural and spontaneous recovery that can be seen with the naked eye will come in the spring of 1933. This is not a forecast, but an hypothesis. It serves the purpose of focusing thought on a certain target, and, as evidence accumulates over the next few months, the evidence itself will suggest whether to raise or lower the target.

The Agricultural Situation

One of the most severe drawbacks to recovery is the depressed condition of agricultural income. The income of the farmer is out of balance with the income of the city classes. This means that an important area of buying power is rigidly curtailed.

This condition remains in spite of advances which have occurred in various farm products during the past two or three months. Much attention has been paid to the rise in livestock prices, but it should be remembered that the average price of hogs in Chicago is still only about 4c. a lb., and four cent hogs will never cause a great rejoicing in the corn belt. The rise in cotton is the most important single development in farm prices, and there is a reasonable statistical case for strength in this commodity. Consumption of American cotton for the current year, July-July, will probably run two million bales, or more, in excess of this year's new crop. Consequently, the tremendous carry-over of cotton will begin to be cut down over the next 12 months. Although this is gratifying, it is necessary still to bear in mind that there is an enormous surplus of cotton and that a large amount of this surplus is being carried by artificial Government aid.

With regard to wheat, the surplus in exporting countries is so great that anyone who has due regard for fundamental statistics cannot get greatly excited about the future of wheat prices. This is not to deny that a speculative bulge in wheat can be engineered later this autumn. But whether that type of movement will eventually do the wheat farmer any good is another question.

The Financial Strain of Next Winter

For several weeks the public has been disposed to forget or ignore many of the factors which previously were considered fundamental. The burden of debt, the unbalanced budget, the unemployment relief problem, and the restrictions on international trade may be cited as illustrations of these fundamental unsolved problems.

Probably public opinion will be redirected to these problems during the coming winter. Congress will be in session, a veterans' bonus bill will undoubtedly be introduced, and an effort will be made to pass it over a Presidential veto. There will be a strong clamor for further unemployment relief. A deficit of $500,000,000, or more, for the first half of this fiscal year may be staring Congress in the face. A strong effort will be made to pass a sales tax and there probably will be equally strong effort to revise the income tax rates established last winter. Also attempts to formulate an economy bill designed to further reduce expenditures may be undertaken. The war debt question will again come to a head and will doubtless give rise to sharp clashes of public opinion.

When these problems were in the forefront of attention at the beginning of this year, they were accompanied by an amazing amount of political hysteria and financial disturbance. It is doubtful whether anything like the same hysteria will reappear during the coming winter, even though the very same problems are up for discussion. Nevertheless, the return of public thinking to fundamental problems is likely to have some sobering effect on general psychology and may bring about some strain and tension in financial circles.

There are some people who claim that such fundamental questions never are solved and that recovery goes right ahead in spite of overhanging problems of this type. There is an element of truth in this view and all that I wish to suggest here is that the country still has to face a number of these problems in a serious mood.

Marking of Foreign Shapes, Sheets, Rails, Track Supplies Ordered

WASHINGTON, Sept. 27.—Imported structural shapes, sheet piling, rails and track accessories must be marked to indicate countries of origin.

An order to this effect was issued last Wednesday by Commissioner F. X. A. Eble of the Bureau of Customs. The marking will be required after the expiration of 90 days following publication of the decision in the weekly Treasury Decisions. It will appear in that publication on Thursday of the present week, thus making the decision effective on Dec. 28.

The decision is similar to one previously made requiring the marking of imported reinforcement bars. The list of structural items, rails, etc., included in the latest order, together with that covering reinforcement bars, includes the bulk of steel imported into the United States. Among the more important products not included are hoops, bands and cotton ties, and it is understood that the bureau will be asked to apply a similar order to those lines. The marking of reinforcement bars was made at the request of the Concrete Reinforcing Steel Institute. The marking of structural shapes, etc., was requested by the American Iron and Steel Institute.

The order of last week permits the marking of containers, packages or covering should any of the affected products be imported in this form. This action was taken under Section 304 of the Hawley-Smoot tariff act. This section provides that every article imported and its immediate container, etc., shall be marked in legible English to indicate country of origin, but the Secretary of the Treasury is authorized to except any article from marking if he is satisfied that the article is incapable of being marked "without injury or except at an expense economically prohibitive of importation" or that the marking of immediate containers will reasonably indicate the country of origin.

The effect of this provision apparently will not be important inasmuch as the products, with the possible exception of small shapes, will not be shipped in containers.

The order specifically covers the following products:

Beams, girders, joists, angles, channels, car-truck channels, tees (including angles, channels and tees less than 3-in. in size), columns and posts, or parts or sections of columns and posts, as well as all other structural shapes of iron and steel and sheet piling, classified under paragraphs 304 and 312 of the Tariff Act.

Iron and steel rails, fish plates, splice bars, tie plates, and railway bars, classified under paragraph 322 of the Tariff Act.

Metallurgical Advisory Board Meets in October

Leading metallurgists of the country will gather in Pittsburgh on Friday, Oct. 28, to hear and discuss reports on studies in steel research undertaken at the Carnegie Institute of Technology. The occasion is the sixth annual open meeting of the metallurgical advisory board to that institution.

The morning session will be devoted to reports on studies made by the bureau of metallurgical research at Carnegie "Tech" on the alloys of iron, manganese and carbon. Dr. V. N. Krivobok and Dr. John Eckel, also of the bureau staff, will report on "The Effect of Carbon on 10 Per Cent Iron Manganese Alloys." Dr. Krivobok will also report on three phases of his study of chrome-nickel-iron alloys; namely, low-carbon alloys, decomposition of 18-8 alloys with various additions, and strength at elevated temperatures. The third report of the morning session will be delivered by Dr. Robert F. Mehl, director of metallurgical research, American Rolling Mill Co., Middletown, Ohio. The subject will be "The Segregation of Ferrite and Cementite from Austenite."

The afternoon session will be devoted to the work of Dr. C. H. Herty, Jr., and his assistants who are working under the auspices of the metallurgical advisory board. His first report will be on "The Deoxidation of Steel with Manganese, Aluminum, Silicon Alloys." In his second report he will be assisted by C. F. Christopher on "The Use of Manganese, Silicon Alloys in Open-Hearth Process." The final report with M. W. Lightner will be on "The Effect of Deoxidation and Furnace Manipulation on Some Physical Properties of Open-Hearth Steel."

A number of prominent metallurgists will discuss the reports. A business session and a dinner, at which Dr. Thomas S. Baker, president of the Carnegie Institute of Technology, will preside, will be held in the evening at the Hotel Schenley.

Coal and Beehive Coke Production Gains

Production of coal and beehive coke during 27 working days in August, according to preliminary estimates of United States Bureau of Mines, was as follows: Bituminous, 22,465,000 tons; anthracite, 3,470,000 tons, and beehive coke, 41,000 tons. These totals compare with the revised production figures for 25 working days in July of 17,867,000 tons of bituminous, 3,021,000 tons of anthracite and 38,200 tons of beehive coke.

Rustproofing Steel by a New Process

A novel process for rendering iron and steel rustless is announced by the Metals Oxidation Corpn., 225 Fifth Avenue, New York. It is offered as an inexpensive and successful method of obtaining the desired black luster and rustproofing property so essential for certain purposes. Its installation and handling are described as simple, requiring neither skilled operators nor expensive apparatus. It is claimed that, on the basis of results, the cost is negligible.

A chemical compound is said to perform the work. The process is briefly described as consisting of dipping the pieces into a bath of the chemical brought to a temperature of about 130 deg. C., the duration of immersion consuming from two to ten minutes, depending on the degree of blacking desired, whether an unpolished finish without any reflex or a blacking as brilliant as enamel.

The process is pointed out as particularly serviceable to manufacturers of small tools, gun and locksmiths, machine tools, bicycles, bolts and nuts, nails and many other similar products. The actual cost is estimated at 1c. for each 100 in. of surface treated.

Japanese Tin Plate Imports Decline

Japanese imports of tin plate have steadily fallen from 80,364 gross tons in 1929 to 40,299 gross tons in 1931, while Japanese producers have increased production, according to the Iron and Steel Division, Department of Commerce. Production of the Government-owned Yawata plant has increased from 17,819 tons in 1929 to 22,430 tons in 1930, it was stated. The United States and the United Kingdom have practically divided this three-year trade between themselves, with the exception of 1931, when Germany shipped to Japan nearly 10,000 tons. In 1930 United States shipments were twice those of Great Britain, while in 1929, as was the case in 1931, the two countries shipped almost equal amounts to Japan, it was pointed out. Shipments over the first six months of the current year totaled 23,802 gross tons for the United Kingdom, and only 4,639 tons for the United States.

OFF THE ASSEMBLY LINE

Automobile Industry Makes Sales Drive While Preparing New Lines

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DETROIT, Sept. 26.

ALTHOUGH there is a much improved sentiment in the local steel trade, engendered by impending business from the automobile industry, actual orders still are light. Efforts on the part of motor car companies are centered as much on the cleaning up of current stocks and the stimulation of sales of present models, even where adequate supplies of cars are lacking, as on the preparation of new models. The desire to rush new products onto the market at this time is notably absent and all announcements of 1933 cars, with possibly one or two exceptions, will be timed for December or the January shows. This hesitancy by automobile builders is attributed to the belief that the presidential election may have a temporary unsettling effect on business and that the longer the delay the further along the country will be toward recovery and the restoration of buying power.

Again Chevrolet holds the news spotlight with an unexpected increase of 10,000 units in its September production schedule owing to favorable results from its intensive sales drive. This rush program brought out an emergency call for steel of all varieties, with quick delivery a predominant factor and in some cases local warehouses were combed to find the specified items. Contrary to earlier plans, Chevrolet now is counting on assembling cars in the early part of October as well as this month, as otherwise dealers would find themselves devoid of stocks of the more popular models long before next year's cars are ready. This latest development makes certain the fact that the 1933 series will not be shown before December. Incidentally, Chevrolet forged ahead into first place in commercial car registrations in the first six months of this year, titling 36,049 units, as against 100,564 for the industry, or 35.8 per cent of the total. This compares with 30.7 per cent last year, 30.1 per cent in 1930 and 30.4 per cent in 1929. It was exceeded only in the first half of 1928, with 43 per cent, when Ford was completely out of production.

Better sentiment exists in Detroit, but steel buying continues meager.

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Chevrolet has increased September production by 10,000 cars, having made a "rush" buy of steel the past week.

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Continental-DeVaux to make new car for low-price market.

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Ford Output Has Receded

Ford production has receded somewhat and stands at 1500 to 2000 cars a day, three days a week. Ford may buy some steel the coming week to balance up certain items and probably will give releases cleaning up old commitments, but beyond that its steel tonnage in the near future looks unpromising. Its steel plant is idle. Ford has purchased a small tonnage of spring steel which it normally manufactures at the Rouge plant. Amid the confusion of stories about prospective Ford changes one fact overshadows everything else—the V-eight block designed and cast in one piece will remain as it is today. Ford suppliers, with few exceptions, are operating at a meager rate.

The Chrysler Corpn. is getting its various divisions primed for a fairly good production run beginning next month. Plymouth is expected to lead off, to be followed closely by Dodge. The latter, with a small job, supposedly a four, priced $50 to $100 under the Plymouth, is set to gain for itself a place in the lowest-price field. The body for the new car will be assembled in a reconditioned building at the local Dodge factory. The line bearing the Chrysler name probably will be held back until show time. Chrysler may give some steel releases in the next few days. Outside foundries furnishing Plymouth cylinder blocks are not yet in production. Dodge has about completed its machine tool purchases totaling more than $100,000, recent orders having included a number of gear shapers.

Buick to Start New Model

Buick will begin manufacturing parts for its new car early in October. While some dies have been delivered to the Flint plant, others are not to be ready until late this week. It probably will be Nov. 1 before other General Motors units get busy. Continental-DeVaux has announced that in the next 90 days it will put a new small car on the market. At the start the car will be assembled at Continental Motors' Muskegon, Mich., plant. Equipment buying in connection with its production will be slight, at least for the present. The alliance between International Harvester Co. and Willys-Overland Co., whereby the latter will make the engine and chassis for a new light International truck, has strengthened Willys-Overland's position and will mean added activity in the southern Michigan district, as the engines will be made by the Wilson Foundry & Machine Co., Pontiac, which is a Willys-Overland subsidiary. In the year ended June 30, International sold 20,000 trucks and was in fourth position in the truck industry in registrations. Willys-Overland has further expanded production by entering the taxicab field. It has on hand unfilled orders totaling 3000 units and the present schedule of 4300 workers on a three-day-a-week basis may be increased soon to four.

An important manufacturer has made notable strides recently in developing a cast steel camshaft designed to replace the forged product. For the past year or two it has had

several thousand cast camshafts in service and they have performed in a satisfactory manner. It is predicted that within the next 12 to 18 months this company will replace the forged camshaft with the cast steel camshaft as standard equipment. Experiments also are going forward on cast steel crankshafts, which have a promising future.

Detroit Notes

Midland Steel Products Co. is supplying all of the frames for the Chrysler car-making divisions, having recently been awarded this business. . . . Chevrolet is expected to place fourth quarter sheet and strip steel contracts this week. . . . Motor Wheel Corpn. of Lansing, Mich., is reported to have received a contract for all of the wheel and brake drum requirements of the Chrysler companies. . . . Skinner Motors, Inc., Detroit, has been licensed by the Chrysler Corpn. to sell floating power engine mountings as replacement parts for Ford cars. The Skinner company will purchase the parts from Amplex Corpn., Chrysler subsidiary. . . . The new Continental-DeVaux car will be an assembled job. The engine will be made by Continental, body by Hayes and parts such as transmission and axles by outside suppliers. Continental's main purchasing department has been moved to Muskegon from Detroit. . . . Muncie Products division of General Motors is now moving into the Buick plant at Flint and will make transmissions there for Buick, Pontiac and Oldsmobile. . . . Several foundries in Detroit specializing in the manufacture of alloy cast iron dies are running at a good pace. Local die shop operations have turned upward in the past two weeks. . . . It is understood that Lansing, Mich., interests have been trying to induce the Nash Motor Co. to take over the idle Durant plant and move there from Kenosha, Wis. Nash has been dissatisfied because of the high tax imposed on Wisconsin manufacturers. . . . Total registrations for August in the automobile industry are estimated at 94,000 cars, compared with 104,188 in July. . . . Hayes Body Corpn., Grand Rapids, Mich., has closed a contract with the Willys-Overland Co. to build the bodies for Willys-Overland cars. Electric Autolite will make the lighting, starting and ignition equipment for the new light International truck.

Following the discovery of large deposits of molybdenum concentrates at Mammoth, Ariz., a contract has been made whereby Molybdenum Corpn. of America agrees to take the full output of ore from the mine there for 10 years. This contract materially increases the reserves of Molybdenum Corpn., which has been supplying its reduction plant at Washington, Pa., with concentrates from the company's own mine at Questa, N. M., since the corporation was organized more than 10 years ago. Large untouched reserves still exist at Questa.

... OBITUARY ...

JAMES H. KINNEY, vice-president and general manager of the Cyclone Fence Co., Waukegan, Ill., a subsidiary of the United States Steel Corpn., died on Sept. 21 of a heart attack after an illness of several weeks. He was born at Steubenville, Ohio, Oct. 2, 1882. In 1900 he was employed by the Cleveland Cyclone Fence Co., which was then not associated with the present Cyclone Fence Co. and worked upward through successive steps to become general sales manager of the Cleveland company. He remained with the new organization which resulted from a merger in 1916 of the Cleveland and Waukegan fence companies. Mr. Kinney was transferred in 1921 to Waukegan, where he assumed the duties held at the time of his death. He was also president of the Standard Fence Co., Oakland, Cal., a subsidiary of the Cyclone Fence Co. He was prominent as a member of the Waukegan-North Chicago Chamber of Commerce.

JAMES H. KINNEY

JOSEPH R. BATES

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JOSEPH R. BATES, for 25 years Pittsburgh district manager of sales for the American Sheet & Tin Plate Co., died at his home in that city on Sept. 26, aged 56 years. He had entered the steel industry with the old Apollo Iron & Steel Co., Vandergrift, Pa., and when this organization was taken over by the American Sheet Steel Co. in 1900 he went to New York in its general offices. He returned to the Pittsburgh district in 1904, and, when the company organized its Pittsburgh sales district in 1907, Mr. Bates was placed in charge.

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THEODORE WILLIAM SIEMON, who until his retirement a few years ago was vice-president, treasurer and a director of the Union Switch & Signal Co., Swissvale, Pa., died at his home in Pittsburgh on Sept. 22. He was born in Allegheny, Pa., now North Side, Pittsburgh, in 1859, and began his business career with the Lewis, Oliver & Phillips Co., iron and steel manufacturer. For a time he was identified with the Philadelphia Co., but in 1899 became associated with the Westinghouse Electric & Mfg. Co., East Pittsburgh, as assistant treasurer. He later served as treasurer of this company, but had been associated with the Switch & Signal company for many years prior to his retirement from active business.

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EDWARD KNEELAND, for many years treasurer of the United Engineering & Foundry Co., Pittsburgh, died on Sept. 18. He was associated with the late Isaac W. Frank in the organization of the Frank-Kneeland Machine Co., Pittsburgh, in 1892, and in 1901 assisted in the merger of a number of plants into the present United Engineering & Foundry Co. Mr. Kneeland had retired from active business in 1923.

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DR. FREDERICK HENRY HATCH, former president of the Institution of Mining and Metallurgy, Great Britain, died at the age of 68.

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N. GEORGE PETINOT, assistant to the president of the Vanadium Corpn. of America, New York, died at Rye, N. Y., after a long illness on Sept. 24. He came to the United States about 1906 with M. Heroult, with whom he was associated in the introduction of Heroult furnaces. In 1909 Mr. Petinot went with the Titanium Alloys Mfg. Co. in the capacity of electrical engineer and metallurgist and remained until 1919, when he became one of the organizers

of the United States Ferro Alloys Corpn. He was sales manager of that company until December, 1924, when it was taken over by the Vanadium Corpn. of America, with which he continued as sales manager. Mr. Petinot was later appointed assistant to the president and for the past few years had been spending part of his time as the company's representative in Paris. Mr. Petinot was a member of the American Iron and Steel Institute and of the Electrochemical Society. He was born in Lyons, France, 57 years ago.

Urges Elimination of Unprofitable Selling

E. T. Weir, chairman National Steel Corpn., in an address before the Purchasing Agents Association of Pittsburgh made a strong plea for the elimination of unprofitable selling. He said: "It is by no means certain that goods sold at a loss are a gain to the purchaser in the long run; certainly they are not a gain to business in general, and if such sales continue for long there can be only one result—lower wages and decreased purchasing power, as one kind of business depends upon another for its success and every failure has its effect on general business.

"I am not discouraged," he added, "at our failure to hold the position attained in 1929, because the fundamentals had not been studied, and it was only luck that brought us to the position recently described by Winston Churchill when he said: 'The United States in 1928 was near to solving the great problem which had baffled the world since its foundation. She had nearly bridged the gap between the consuming and the producing power.'

"The world is not suffering from permanent over-production, for no one is satisfied with what he possesses and human wants are never ending. We have an excess of production only because of the forced decrease in consumption and not because wants or requirements are decreased. Put living wages in the hands of our millions of unemployed men and women again and we will have no over-production. Obviously, our economic situation is not properly balanced.

"There is something of a universal agreement today that much of this trouble comes from the improper distribution of income and earnings. In the long run, if either capital or labor is able to secure a greater percentage of the earnings than it is entitled to, it will surely be penalized in time.

"Better balance between production and consumption can be accomplished as a result of study of daily business by business men and a realization that permanent profit can only come from a normal distribution of the income of all production."

...PERSONALS...

JOHN A. COAKLEY, who has been appointed general traffic manager of the leading subsidiaries of the United States Steel Corpn., has been connected with the American Steel & Wire Co. for more than 30 years and since early last year has been vice-president of that company in charge of traffic. It was erroneously stated last week that he had been connected with the American Sheet & Tin Plate Co. After leaving school Mr. Coakley in 1899 entered the employ of the American Steel & Wire Co. as a freight clerk in Pittsburgh. He was transferred to Cleveland in 1904 as division freight agent, which position he held for 17 years. In 1921 he became traffic manager. With his promotion his headquarters will be moved to Pittsburgh, Oct. 1.

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WALTER J. KOHLER, president, Kohler Co., Kohler, Wis., manufacturer of heating equipment and plumbing supplies, has been nominated for Governor of Wisconsin. Mr. Kohler served as Governor of that State from 1928 to 1930.

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HARVEY LEFEVRE, formerly sales manager of the H. K. Porter Co., Pittsburgh, has joined the staff of the Heisler Locomotive Works, Erie, Pa.

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GEORGE G. THORP, president, Illinois Steel Co., has been elected to the board of trustees of Armour Institute of Technology, Chicago. Mr. Thorp is a graduate in mechanical engineering of the University of Wisconsin.

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WALTER C. KEYS, consulting engineer, Detroit, has been elected a member of the council of the Society of Automotive Engineers, Inc., to fill the unexpired term of the late Fred S. Duesenberg.

R. F. C. Considering Large Loan for Brooklyn-Staten Island Tunnel

WASHINGTON, Sept. 27.—Engineers of the Reconstruction Finance Corporation are expected to make an early report on the application for a loan of $39,400,000 for the building of the Staten Island rapid transit tunnel, whose steel requirements are estimated at 25,000 tons. The project, a proposed subway from Staten Island to Brooklyn, will cost about $90,000,000, and the loan was urged before directors of the Reconstruction Finance Corporation last Thursday by a delegation headed by Senator Wagner and Representative Prall of New York.

Engineers of R.F.C. have approved a loan for the Belt Line bridge over the Mississippi River above New Orleans. It will require about 58,000 tons of structural steel and 5000 tons of concrete reinforcement bars. The structural material has been allocated, 30,000 tons to the McClintic-Marshall Corpn. and 28,000 tons to the American Bridge Co.

Seeking a loan of $900,000 from the R. F. C., the Chesapeake Beach Railway Co. has filed a petition with the Interstate Commerce Commission stating that the money would be used for the installation of ferry service across Chesapeake Bay between Chesapeake Beach and Hudson, Md. Eugene Fox, executive vice-president of the company, announced that plans are ready to proceed with construction of two boats, piers and docks.

The New York, New Haven & Hartford Railroad has formally applied to the Interstate Commerce Commission for a "work" loan of $700,000 from the Reconstruction Finance Corporation to be used for the repair in the railroad's own shops of 93 freight and passenger locomotives and 160 freight cars.

The loan of $500,000 asked by the Central Railroad of New Jersey is sought for use in repairing 75 locomotives, 900 freight cars and 55 passenger cars at an estimated cost of $450,000, and to repair marine equipment necessary for handling freight traffic in New York Harbor at an estimated cost of $50,000. Expenditures for repairs to locomotives and cars would be made in about equal installments of $90,000 monthly.

In order to enable applicants for loans as well the R. F. C. to get into immediate action, particularly upon the many smaller construction projects, services of leading engineers of the United States have been made available without cost to the R. F. C. The tender of the services of the engineers was made to the R. F. C. by President W. S. Lee and Executive Secretary L. W. Wallace of the American Engineering Council. They were invited by the R. F. C. to advise how the work relating to self-liquidating projects might be expedited. The arrangement was made with the council for the specific purpose of benefiting those desiring to apply for loans on small projects.

. . . LETTERS TO THE EDITOR . . .

Industry's Two Shifts Proposed for Washington

Editor, The Iron Age:

Replying to your inquiry concerning a recent suggestion of mine for making more use of existing Government buildings at Washington and thus saving the erection of new buildings, at a cost of millions, I send herewith a working plan.

We arranged a similar two-shift schedule for our shops (the Morgan Construction Co.) ten years ago, and it has been in operation ever since. If adopted at Washington all new Government building now under way could be stopped at once.

We adopted the two-shift plan in our business in Worcester as a measure of economy, not fully anticipating the great benefits which would result from the lower capital investment in plant in a time of prolonged depression such as we are now experiencing. The economy and reduced risk resulting from this plan are self-evident. So far as the effect upon the workers is concerned we can say that we have no knowledge of dissatisfaction on the part of our employees. The plan is flexible enough so that men can change from the first to the second shift to suit their own personal convenience, as the sleeping hours are substantially the same for the two shifts. Both shifts are off Saturday afternoon and Sundays and in one plant each shift of men worked 44 hr. per week.

It will be noticed that the second shift is free from Friday evening until Monday afternoon, and this long free period has proved very satisfactory to the younger men. With us, the older men usually prefer to work on the first shift, which involves working Saturday morning, with shorter hours on other days of the week.

It should be stated that there is some difficulty in certain lines of manufacture in operating on a double-shift basis because of the problem of securing overlapping supervision. We solved this problem in our plant, which changed shifts at 2.30 p. m., by having the foreman on the second shift go on duty at 2 o'clock and the foreman on the first shift remain on duty until 3 o'clock. This gave one full hour of overlapping supervision, which proved to be quite satisfactory.

Of course, not all plants can operate on the two-shift plan, since some are obliged to work 24 hr. a day and six or seven days a week because of the nature of their business. Others, for equally good reasons, cannot operate on more than a single shift, but unquestionably there are many plants which could be built up or changed to operate on a double-shift basis, such as we have so successfully employed.

There is much serious talk and some criticism of industry, especially by politicians who claim there has been over-expansion based on high-pressure selling and installment buying plus poor judgment. Our plan of plant operation automatically prevents over-expansion within the time limit of plant operation, which can be carried on without violating modern ideas of the hours employees should work.

I can see no reason why most clerical work done in Washington could not be done, at least at a time like the present, on a two-shift basis.

Jerome R. George.
Worcester, Mass.

Alloy "Indicators" and Corrosion Problems

Editor, The Iron Age:

May I be allowed to make one comment on Mr. Nelson's interesting article on "Alloy 'Indicators' Suggested for Solving Corrosion Problems" in THE IRON AGE of Sept. 1, 1932?

In order to determine the material best suited for a given purpose, Mr. Nelson suggests trying test pieces of corrosion-resisting alloys as indicators under actual operating conditions.

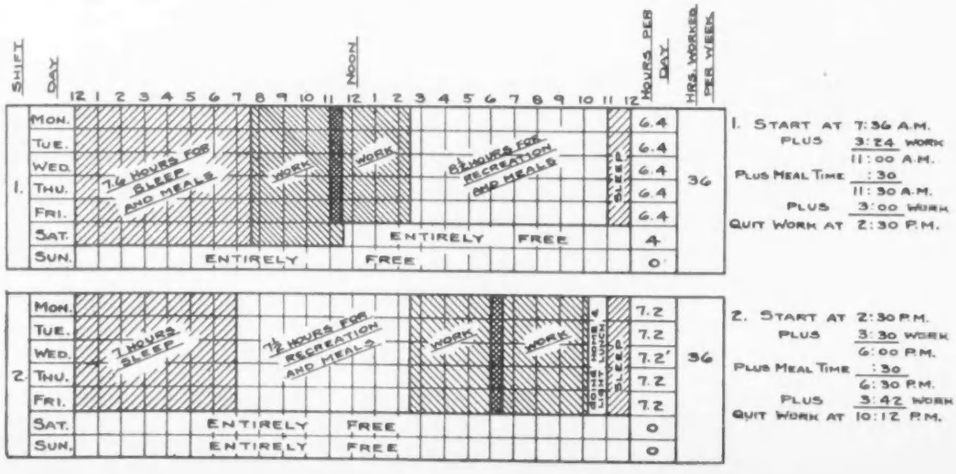
This simple procedure is, of course, very often followed in the selection of such materials and one must thoroughly agree with Mr. Nelson as to the desirability of more extended application of this method; yet I wish to add another thought to his suggestion, namely, that unless other factors which affect the behavior of corrosion-resisting materials besides the plain exposure to the corroding reagents are considered, these simple indicators may lead one into serious errors.

For instance, some time ago a simple test piece, similar to those mentioned by Mr. Nelson, was suspended in a certain acid solution for months, and after examination it was found to be practically unaffected; but the same material, when made into a tank for the same solution, failed badly. Apparently the construction of the tank had much to do with the failure upon which a simple test piece could not throw any light.

Again, another acid-resisting material was found to be excellent for a certain molten salt bath when suspended in the salt in the form of a plain test piece; yet the same material when used in the form of a basket did not prove so satisfactory. The material when used as basket was subject to working stresses in lowering and raising the charge in and out of the salt bath. The original test piece when suspended in the bath was not subject to this modifying condition.

There are, of course, many other factors which affect the final result and show that these indicators, however useful, have to be used with much care.

H. G. Keshian
Chase Brass & Copper Co.,
Waterbury, Conn.



TIME study for Federal Government departments working two shifts 36 hours per week, using office plant 72 hours per week.

• • EDITORIAL COMMENT • •

Fundamental Maladjustments, Economic and Emotional

CURRENT evidences of economic convalescence are being discounted by sage warnings that further setbacks are ahead and that fundamental maladjustments remain uncorrected. The word "fundamental" has a strangely familiar sound. At the time of the Wall Street panic, business was declared to be "fundamentally sound." Today we are told that recovery is held back because business the world over is still "fundamentally" out of balance.

One wonders whether the dictum of today is any closer to the truth than that of three years ago. Of course, it would be foolhardy to deny that the world is still harassed by many serious economic and political problems. But what is overlooked today, just as it was overlooked late in 1929, is that the affairs of mankind are strongly conditioned by mass emotions, about which our present-day knowledge is still limited. The interplay of the subjective and the objective in a highly complex and interdependent world will always make economics an uncertain and "dismal" science. It is just as hazardous to predict that world maladjustments will hold back business recovery as to prophesy that economic improvement will proceed in the face of and despite so-called fundamental unbalance.

Certain it is that the acute fears aroused by the recent financial crisis have subsided. Certain it is that hoarded money has come out of hiding and percolated into the security and commodity markets. Certain it is that a number of business indicators have shown seasonal or better than seasonal advances. Certain it is that people cannot remain in the same emotional state indefinitely.

Possibly it will be found "fundamentally" as true that despair and gloom must be followed by confidence and courage as that excessive speculation and overproduction must be followed by deflation and depression. Surely those who are trying to throw water on the sparks of returning confidence are doing business no service. It is true that debts have mounted and much purchasing power has been destroyed, but it cannot be disputed that there are still many with the wherewithal to buy who have been deterred from doing so only by fear of the future. Once that fear is removed, a great mass of accumulated wants will be translated into purchases, and these in turn will generate employment and new buying power.

Man in the mass cannot remain in the dumps forever. He cannot play the miser's rôle indefinitely. "Fundamentally" he requires periodic correction of his emotional maladjustments.

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"Rare" Metals Play Increasing Rôles

ANNOUNCEMENT recently that a prominent steel company has succeeded in producing an alloy steel containing selenium focuses attention on the fact that some of the rarer elements are slowly playing a more important rôle in steel metallurgy. That steels are being discovered having desirable properties and containing not only selenium but also beryllium is significant and emphasizes anew the statement that the work of our research metallurgists is constantly bearing fruit. It is easily recalled that vanadium and also molybdenum were classed as rare metals when they first became a factor in steel metallurgy. Their cost was high and little was known as to their possibilities in the alloy steel field. Today they are as familiar and as indispensable as some of the older alloying metals. If history repeats itself, what may not be the value in metallurgy of some of the less used metals of today. Already the prospects for beryllium are bright, but its cost, which is almost prohibitive now, must and will come down as was the case with vanadium and molybdenum and others.

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Car Loadings Show Favorable Trend

REVENUE freight car loadings in the week ended Sept. 17, reported at noon last Saturday by the American Railway Association, totaled 587,302 cars, the largest since the week ended Dec. 12 of last year.

How much of the recent increase has been purely seasonal, and how much, if any, has been due to trade recovery? The trend since July has certainly been much better this year than in either of the last two years.

To answer these questions properly close comparisons must be made, and for this index numbers are necessary. The stock market low for this year fell on Friday, July 8. The Lausanne accord was announced the next day and trade sentiment then began to turn in the favorable direction. Let us therefore take the car loading for the 28 weeks through July 16 as our base, three three-week periods having since been reported upon.

FREIGHT CAR LOADING INDEX NUMBERS

	First 28 Weeks*	Next Three	Next Three	Next Three+
1932	100	93.6	97.4	102.4
1931	100	101.7	102.5	98.6
1930	100	102.2	106.1	103.3
1929	100	110.5	113.9	111.8

*Through July 16. +Through Sept. 17.

Industrial recession began just after July 1, 1929, and the subsequent increase in car loadings was plainly seasonal, but the increase did not extend into September when in previous years it had generally culminated in October. Trade recession was beginning to have an influence. In both 1930 and 1931 trade recession was in progress but seasonal influence offset it more or less.

This year, on the contrary, there has been a very marked climb. The three weeks through Sept. 17 ran 9.4 per cent above the three weeks through Aug. 8, while in 1931 there was a decrease and in 1930 and 1929 only very slight increases. For the single week of Sept. 17 the showing is still more pronounced. Admittedly, with light loadings all around the seasonal increase in grain loadings is more of a percentage factor than usual, but the case seems to be clear that there is some general increase and that the comparison with the trends at this time in the first two years of depression is favorable.

European Steel Business Is Still Improving; Prices Firmer

Welsh Tin Plate Higher—British Sheets for Export Advanced—Rail Quotation to Be Maintained

LONDON, England, Sept. 26 (*By Cable*).—The pig iron market is quiet, but steel demand is improving and more furnaces are being started up. Naval contracts now being released provide a considerable volume of work. Merchant shipbuilding orders are also slowly increasing. Hence, the steel outlook is slightly better.

Tin plate is strong owing to active home and export buying. A considerable tonnage has been placed for shipment up to June, 1933, at 16s. per base box, f.o.b. port nearest works. Higher prices are now being asked. Export demand has been widespread excepting the Far East. Welsh output is about 60 per cent of capacity, but in view of the revival of demand is likely to go higher in the near future.

British sheet makers have reintroduced a minimum export price of £10, base, f.o.b., for galvanized sheets and No. 24 corrugated sheets, and a minimum of £8 5s., base, f.o.b., for No. 24 annealed black sheets. Russia is inquiring for 3000 tons of black sheets.

Overseas demand for Continental steel is expanding. Outlook is considered much more favorable. Belgian and Luxemburg steel makers have formed a gentlemen's agreement on plates, sheets and bars, and the following minimum export prices have been arranged: plates, 5mm., £2 17s. 6d.; 4mm., £3; ⅛ in. sheets, £3 2s. 6d.; bars, £2 8s. 6d.; all f.o.b.

Belgian, French and Luxemburg mills are sharing orders for 220,000 steel railroad ties for South Africa.

The International Rail Makers Association will maintain the heavy rail price during the fourth quarter at £5 10s. gold, f.o.b.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9 0s.
Billets, open-hearth	£4 17s. 6d. to £5 7s. 6d.
Black sheets, Japanese specifications	£9 12s. 6d.
Tin plate, per base box	16s. to 16s. 3d.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hrth.	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s.
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£8 5s.
Galvanized sheets, No. 24 gage	£10

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 8s.
Beams, Thomas	£2 3s.
Angles, Thomas, 4-in. and larger	£2 7s. 6d.
Angles, small	£2 9s. 6d.
Hoops and strip steel over 6-in. base	£3 0s. to £3 2s. 6d.
Wire, plain, No. 8	£5 5s.
Wire nails	£5 7s. 6d.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Canadian Pig Iron Output at New Low

Pig iron production in Canada during August fell to a new low monthly record of only 5992 tons. One furnace at Hamilton, Ont., which was active at the end of July, was banked last month, with the result that no Canadian furnaces were in blast on Aug. 31.

Steel ingot and castings and ferroalloys production in August also reflected further declines, though slight, from the preceding month's output.

August production figures and comparisons follow:

	Aug., 1932	*July*, 1932	*Aug.*, 1931
Pig iron	5,992	7,317	23,212
Steel ingots and direct steel castings	26,710	27,506	52,491
Ferroalloys	871	892	8,248

Chicago-Milwaukee Rate Reduction Denied

WASHINGTON, Sept. 27.—In a decision announced last Thursday, the Interstate Commerce Commission denied the application of three railroads to establish a rate of 8.5c. per 100 lb., minimum carload 80,000 lb., on iron and steel from the Chicago district to Milwaukee without observing the long-and-short-haul provision.

The carriers are the Elgin, Joliet & Eastern, the Indiana Harbor Belt and the Soo Line. The present Chicago-Milwaukee rate over these lines is 14.5c., minimum 40,000 lb. It was proposed to maintain higher rates to intermediate points, from Feehanville, Ill., to Waukesha, Wis., on the Soo Line. The carriers had sought the reduced rate to Milwaukee because of water-compelled competition, according to the application.

The commission declared that the record does not show that water competition from any of the points to Milwaukee is present in such degree as to justify the relief sought. It was stated also that while the railroads relied primarily upon water competition, their application is the direct outgrowth of their desire to meet the competition of the direct routes of the Chicago, Milwaukee & St. Paul and the Chicago & North Western Railroads, which maintain the rate of 8.5c. from Chicago to Milwaukee.

To Build Sky-ride for Chicago Exposition

Two giant towers, 620 ft. high and 2000 ft. apart, will shortly be put under construction at the International Exposition grounds at Chicago, contracts having been signed Sept. 16. The structures will constitute the main members of a sky-ride for visitors to the exposition, passenger-carrying rocket cars to ply between the towers at the 200-ft. level. It is expected that the project will be completed two months before the opening date of the exposition, June 1. Robinson & Steinman, New York, will supervise the building of the ride, and among the contractors are the Great Lakes Dock & Dredge Co., Inland Steel Co., Mississippi Valley Structural Steel Co., John A. Roebling's Sons Co. and Otis Elevator Co.

Gray Iron Industry's Business Gains

The gray iron foundry industry showed quite an improvement in production, new business and unfilled orders in August as compared with July, according to the monthly report of the Gray Iron Institute. Production last month was 38.6 per cent of normal, as compared with 30 per cent in July. New business was 32.2 per cent of normal, against 28.5 per cent the previous month, and unfilled orders were 27.2 per cent, against 23.3 per cent the previous month.

Three Navy Destroyers To Be Built

Contracts have been awarded for the building of three destroyers by the United States Navy, one each to be built at the Navy yards at Boston, Philadelphia and Brooklyn.

Carboloy Co., Detroit, has inaugurated a "milled and brazed service," the milled and brazed Carboloy cemented-carbide tools being the same as the regular finished tool except that they require a small amount of grinding to put them in operation, and are lower in price.

SUMMARY OF THE WEEK'S BUSINESS

Steel Production Gains Sharply at Chicago as Business Improves

Ingot Output for the Country at 17½ Per Cent This Week—Minor Increases at Pittsburgh and in the Valleys

STEEL ingot production has risen this week to an average of 17½ per cent for the entire country, largely because of a gain at Chicago from 13 to 17 per cent, but aided also by lesser improvement at Pittsburgh and in the Valleys. The Birmingham district, at 33 per cent, has the best operation in the country, but is closely followed by the Wheeling district, which is at 30 per cent for the second week.

With the higher rate this week, September output will closely approximate that of June, when daily production of ingots was 34,511 gross tons compared with the low record of 30,830 tons in August. Further improvement is rather definitely indicated for October, though it probably will come about gradually and in small measure. September orders for many steel companies have been 8 to 10 per cent heavier in the aggregate than those of August.

It is significant that most of the gain at Chicago has come principally in orders from the miscellaneous group of buyers, including many small shops, with the major steel consuming industries contributing less than their normal portion to the better tonnage, a situation that prevails, in fact, throughout the country.

MAJOR industries are expected to become more of a factor in the steel market within the next 30 to 60 days. Railroads are opening up repair shops, and, though their purchases thus far are small, they will need material soon. The Pennsylvania will ask for prices this week on about 9000 tons of plates and 6000 tons of shapes and bars for the building of 1285 cars in its own shops, and has placed orders for 7500 light rolled steel wheels. The New York, New Haven & Hartford has formally applied to the Reconstruction Finance Corporation for a loan of $700,000 for the repair of 93 locomotives and 160 freight cars. The Central of New Jersey, which has applied for $500,000, will repair 75 locomotives, 900 freight cars and 55 passenger cars and marine equipment. The New York Central is expected to announce shortly a large repair program, and other roads undoubtedly will follow.

Large construction projects to be financed by R. F. C. loans will be slower to reach the steel mills than the requirements of the railroads, but progress is being made on several important applications. A loan has been approved for the Belt Line bridge over the Mississippi River near New Orleans, which will require 58,000 tons of structural steel and 5000 tons of reinforcing bars. The structural material has been allocated to two fabricators. An early report is expected from R. F. C. engineers on a tunnel from Brooklyn to Staten Island, which will require 25,000 tons of steel. Plans have been made to expedite the granting of many small loans by the R. F. C. Structural steel inquiries total 18,400 tons, the largest since the last week of August, and lettings amount to 15,200 tons.

The automobile industry is proceeding somewhat more slowly with production of new models than had been expected. However, Buick will begin manufacturing parts for its new car next month, Dodge Brothers division of Chrysler Corpn. has bought about $100,000 worth of machine tools for model changes, and Continental-De Vaux is proceeding with plans for a new light car. Meanwhile, Chevrolet has stepped up production to build 10,000 more of its present model than had been contemplated as the result of an intensive sales drive. Ford's output has receded somewhat, now being 1500 to 2000 cars a day three days a week. Aside from tonnage placed by Chevrolet for its additional production, orders from the motor car industry are of small proportions.

PIG iron markets are less active than they were a few weeks ago, but shipments are gaining, the increase at Chicago as compared with August being 50 per cent. An inquiry for 15,000 to 20,000 tons of basic pig iron is current at Pittsburgh. The distribution of orders for 50,000 tons of pig iron by the American Radiator & Standard Sanitary Corpn. is expected to bring smaller melters into the market, as buying movements in the past have usually been initiated by the large consumers.

Scrap still displays a firm tone, though price changes are fewer. A Steel Corporation subsidiary has bought 21,000 tons of steel scrap for its Lorain, Ohio, works, and a large purchase by this interest in the Chicago district is expected.

Steel prices for the fourth quarter have been generally announced, but consumers are indifferent as to contracts. Sheet makers have taken a firm stand for higher levels, which on most grades are those that were in effect at the beginning of this quarter. Efforts are also being made to strengthen cold-rolled strip prices, which have recently sagged. Makers of wrought iron pipe have followed the lead of steel pipe producers in adopting simplified discounts which eliminate the preferentials that were in effect. Net prices are essentially unchanged.

THE IRON AGE composite prices are unchanged at 1.965c. a lb. for finished steel, $13.64 a gross ton for pig iron and $7.75 a gross ton for heavy melting scrap.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Sept. 27, 1932	Sept. 20, 1932	Aug. 30, 1932	Sept. 29, 1931
Per Gross Ton:				
No. 2 fdy., Philadelphia	$13.84	$13.84	$13.84	$16.26
No. 2, Valley furnace	14.50	14.50	14.50	17.00
No. 2 Southern, Cin'ti	13.82	13.82	13.82	14.69
No. 2, Birmingham	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*	15.50	15.50	15.50	17.50
Basic, del'd eastern Pa.	13.50	13.50	14.00	16.75
Basic, Valley furnace	13.50	13.50	13.50	15.50
Valley Bessemer, del'd P'gh.	16.89	16.89	16.89	18.76
Malleable, Chicago*	15.50	15.50	15.50	17.50
Malleable, Valley	14.50	14.50	14.50	17.00
L. S. charcoal, Chicago	23.17	23.17	23.17	25.04
Ferromanganese, seab'd carlots	68.00	68.00	68.00	85.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	32.00	32.00	32.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	29.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	29.00
Slabs, Pittsburgh	26.00	26.00	26.00	29.00
Forging billets, Pittsburgh	33.00	33.00	33.00	35.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.93
Tank plates, Pittsburgh	1.60	1.60	1.60	1.60
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.898	1.898	1.898	1.88
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.60
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.855
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.10
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.55
Cold-rolled strips, Pittsburgh	1.90	1.90	2.00	2.15

Finished Steel

Per Lb. to Large Buyers:	Sept. 27, 1932 Cents	Sept. 20, 1932 Cents	Aug. 30, 1932 Cents	Sept. 29, 1931 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.10	2.10	2.10	2.40
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.20	2.20	2.20	2.50
Sheets, galv., No. 24, P'gh	2.75	2.75	2.75	2.90
Sheets, galv., No. 24, Chicago dist. mill	2.85	2.85	2.85	3.00
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.70
Hot-rolled sheets, No. 10, Chicago dist. mill	1.65	1.65	1.65	1.80
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$9.75	$9.75	$9.25	$10.50
Heavy melting steel, Phila.	7.25	7.25	6.75	8.50
Heavy melting steel, Ch'go	6.25	6.25	6.25	8.00
Carwhee's, Chicago	7.00	7.00	7.00	9.50
Carwheels, Philadelphia	10.00	10.00	8.50	12.00
No. 1 cast, Pittsburgh	10.00	10.00	9.50	10.00
No. 1 cast, Philadelphia	9.50	9.50	8.50	11.50
No. 1 cast, Ch'go (net ton)	6.25	6.25	6.25	8.50
No. 1 RR. wrot., Phila.	7.50	7.50	8.50	10.00
No. 1 RR. wrot., Ch'go (net)	**5.50**	5.00	3.75	7.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$2.00	$2.00	$2.00	$2.40
Foundry coke, prompt	2.75	2.75	2.75	3.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	6.37½	6.37½	5.75	7.37½
Electrolytic copper, refinery	6.00	6.00	5.37½	6.75
Tin (Straits), New York	**24.50**	24.35	24.37½	22.37½
Zinc, East St. Louis	3.25	3.25	2.85	3.65
Zinc, New York	3.62	3.62	3.22	4.00
Lead, St. Louis	*3.25*	3.45	3.45	4.22½
Lead, New York	*3.30*	3.50	3.60	4.40
Antimony (Asiatic), N. Y.	5.62½	5.62½	5.50	6.60

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Sept. 27, 1932	1.965c. a Lb.	$13.64 a Gross Ton	$7.75 a Gross Ton
One week ago	1.965c.	13.64	7.75
One month ago	1.964c.	13.64	7.42
One year ago	2.014c.	15.42	9.00
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1932	1.976c., June 28	1.926c., Feb. 2	$14.81, Jan. 5	$13.64, Aug. 16	$8.50, Jan. 12	$6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Steel Orders Continue To Show Moderate Improvement

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PITTSBURGH, Sept. 27.—Specifications for finished steel products in this district continue to show moderate improvement, and the average gain over August with most large producers was 8 to 10 per cent. From a tonnage standpoint the increase has been rather trivial, but real significance is attached to the fact that business is reacting to seasonal trends. Some disappointment is expressed because the gain has been no more than seasonal, but steel makers hold to the belief that a further increase in October will be sufficient to indicate the beginning of a slow recovery in business.

The election outweighs all other factors in influencing fall activity in the steel industry, and most predictions are hinged on its outcome. The month has passed by without any definite increase in business from the principal steel consuming industries.

Structural steel inquiry has been materially increased in the last two weeks by Government projects, but these have not been translated into definite tonnage. The same might be said for the railroads, although some orders for steel wheels and car repair steel have already been placed. The bulk of prospective tonnage in this line will come out in October. Automotive releases continue light, and lack of specifications this month may indicate that many important increases in automobile production will be delayed until November. Buying by jobbers and small consuming manufacturers of steel continues to pick up, and releases for tin plate are continuing at recent improved levels.

Steel ingot production in the Pittsburgh district has risen slightly to about 15 per cent of capacity. In the Valleys and northern Ohio the tendency is also upward. Wheeling district output continues at about 30 per cent. Sheet mill schedules have passed the 20 per cent mark, and tin plate production averages nearly 40 per cent. Structural mills are running at about one-third of capacity, but bars and plates average scarcely 15 per cent.

An inquiry for 15,000 to 20,000 tons of basic pig iron has given the iron market a better tone. Scrap is dull, but prices on most of the grades are holding.

Steel specifications show moderate improvement, orders in September running 8 to 10 per cent ahead of last month's.

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Pittsburgh ingot production at 15 per cent. Slight gain also in Valleys.

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Inquiry for 15,000 to 20,000 of basic gives better tone to pig iron market.

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Scrap market steady.

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Pig Iron

A non-integrated steel company is inquiring for 15,000 to 20,000 tons of basic pig iron. The consumer can accept water delivery, and several producers are expected to quote. A radiator maker is inquiring for 300 tons of foundry iron. A few other lots of 100 to 200 tons are before the trade. The American Radiator & Standard Sanitary Corpn. is reported to have included no iron for Pittsburgh district plants in its recent purchase of 50,000 tons. Shipments of pig iron continue to show improvement over those of August, and new buying the latter half of September has been more encouraging. Prices are unchanged.

Semi-Finished Steel

Shipments are beginning to show an increase over those of August. Some non-integrated users which had been inactive have resumed production. Most consumers are covered for their fourth quarter requirements at $26, Pittsburgh. Forging billets are well maintained at $33, and wire rods at $37, Pittsburgh or Cleveland.

Rails and Track Accessories

Occasional miscellaneous releases for rails and accessories are reaching local mills, but not enough tonnage has been accumulated to bring the Pittsburgh rail mill into production. No forward inquiry for rails has appeared.

Bars, Plates and Shapes

Inquiry for structural steel continues to accumulate, a leading fabricator having figured on nearly 20,000 tons of new work in the past week. Most of these projects are being financed by the Government, and waterways improvement accounts for a considerable tonnage. A lock at London, W. Va., will take 2100 tons, and considerable work is being planned for the Allegheny River near Pittsburgh. Inquiries also appeared for substantial tonnages in the St. Louis and Rock Island, Ill., districts. Outstanding among the week's awards is the Cincinnati post office, which will take 4200 tons of structural steel. With the exception of river work, demand for plates is rather quiet, as the railroads are not yet making definite inquiry for their repair requirements. The Reading is still purchasing material against its old inquiry, and the Pennsylvania may ask for bids this week on approximately 19,000 tons of steel. It is understood that the Baltimore & Ohio loan will be authorized by the Reconstruction Finance Corporation within the next few days. The Central of New Jersey and the New York, New Haven & Hartford are also asking for funds to repair and rebuild cars. Demand for barges continues dull, as business is slow to get past the inquiry stage. The United States engineer at St. Louis is taking bids on 40 pontoons and pipe sections, requiring 900 tons. Merchant bars are quiet, although limited improvement in miscellaneous demand is reported. Alloy steel bars are extremely dull. The 1.60c., Pittsburgh, price on bars, plates and shapes is well maintained.

Bolts, Nuts and Rivets

Inquiry from the railroads has given this market a more favorable aspect, although tonnage from the automobile and building industries is still generally lacking. Prices are well maintained, with most consumers now covered for the last quarter of the year.

Wire Products

Movement of wire products to agricultural regions continues to show moderate improvement, but manufacturers' wire is very quiet. Spring wire is also in light demand. New bids are being taken on approximately 24,000 tons of cable required for the Golden Gate bridge at San Francisco. Wire and nail prices are generally well held.

Tubular Goods

Demand for pipe is showing improvement over that of August, which is rather considerable from a percentage standpoint, but is providing little tonnage for the mills. Standard

pipe accounts for most of the gain, although there is a seasonal pick-up of fair proportions in commercial boiler tubing. Practically no line pipe tonnage is before the trade, and oil country goods are dull. Mechanical tubing is adversely affected by lack of automobile tonnage. Prices of wrought iron pipe have been readjusted, with the issuance of new basing discounts which are net and not subject to the former preferentials. This is in line with a similar policy adopted early in the month by makers of steel pipe.

Sheets

Continued improvement in miscellaneous releases for sheet steel has enabled the industry to boost production over the 20 per cent level for the first time in about two months. Output of galvanized material has shown the most substantial gain, with capacity now engaged at 30 to 35 per cent. This improvement has come about without the benefit of automobile tonnage, as full finished sheet schedules are still averaging less than 10 per cent. Releases from some of the automobile makers are expected this week, but have been slow to materialize thus far. Jobbers are still taking a fair tonnage, but the more important consuming industries reflect no general increase in demand.

Prices on black and galvanized sheets are better maintained, and low-priced tonnage will be specified before the end of the month. Present indications are that current quotations of 2.85c. on galvanized and 2.20c. on black sheets will be generally maintained after Oct. 1. Prices on auto body material are not clearly defined, although the official figure is 2.75c., Pittsburgh. Light cold-rolled sheets take the usual $3 a ton differential, while heavy cold-rolled are quoted at $10 under light. Ordinary hot-rolled sheets are fairly well held at 1.55c., Pittsburgh.

Tin Plate

Production rose to 40 per cent of capacity last week, and is still maintained at slightly under that figure. There are prospects of a further gain in the first week of October. Tonnage being rolled is generally for rush shipments, and there is not much material as yet being produced for anticipated demand. The official price is not expected to be announced until Nov. 15, and expectations are that it will be reduced slightly or maintained. The sharp reduction considered earlier in the season is now considered unlikely.

Strip Steel

Specifications for hot and cold-rolled strip continue very light, even though most producers are maintaining shipments ahead of August. Mills continue to run on intermittent schedules. The price of hot-rolled strip is well maintained at a minimum of 1.45c., Pittsburgh, with small orders bringing a higher price. Cold-rolled strip is quotable at 1.90c. to 2c. Small users are generally paying 2c.

Coke and Coal

Local foundries are increasing their requirements slightly, but the gain in shipments over August has been very slight. The producers are preparing for domestic business, but dealers are in no hurry to place their forward requirements. Furnace coke is very dull, and prices are weak, with the $2, Connellsville, price being shaded in some instances.

Scrap

No important mill purchases have been reported in the last week, but the market on No. 1 heavy melting steel is maintained at $9.50 to $10. Hydraulic compressed sheets are weaker, as the urgent demand which has continued for the last month has abated. The other grades are generally unchanged, and scrap coming out in this market is quickly absorbed by brokers with short orders. A large purchase by a northern Ohio consumer has strengthened the market in the Valleys and helped to maintain the price structure at Pittsburgh.

Birmingham Steel Output Up to 33 Per Cent

BIRMINGHAM, Sept. 27.—Pig iron shipments and sales are light. A few inquiries are reported, but the percentage of business developed is small. Fourth quarter contracts are few, the majority of consumers evidently intending to buy for immediate requirements only.

Last week proved very dull for pressure pipe manufacturers, and this week the plants of both the American Cast Iron Pipe Co. and the National Cast Iron Pipe Co. are idle.

Blast furnaces in operation last week totaled three. The No. 2 furnace of the Woodward Iron Co., which is expected to go out soon, is still active on foundry iron. The other two active stacks are the No. 3 of Woodward Iron Co., making foundry, and the Fairfield No. 6 of the Tennessee company, making basic. Two producers with furnaces now idle may blow in a stack each some time in October, depending upon the market and depletion of stocks. The quotation of $11 for the Southern market remains firm.

Steel

Steel tonnage last week, as in the past several weeks, maintained the level established the latter part of August, when the seasonal demand for agricultural requirements started a fair flow of orders. Sheets continue to lead in demand.

Eight open-hearths were in operation last week, an increase of one over the preceding week. The additonal unit was placed in operation on Sept. 19 at Fairfield by the Tennessee company. Four are now in operation at Fairfield and the Gulf States Steel Co. continues to operate four at Alabama City.

Cincinnati Pig Iron Sales About 1000 Tons

CINCINNATI, Sept. 27.—New pig iron business slackened the past week following efforts of some users the previous week to cover in anticipation of future business. Bookings were less than 1000 tons, all in single carload lots. Minor improvement of the melt in stove foundries is noted, but this is offset by the continued low rate of operations in other foundries. Recent purchases indicate a slight steadying of Northern prices, but keen competition is retarding definite price strength. Southern iron is firm at $10, base Birmingham, and furnace representatives are adhering to quoted silicon differentials. An inquiry from Indiana for 1000 tons of foundry iron is current.

Coke

Shipments of by-product foundry coke are reported to be moderately improved as the result of activity in stove making. New business is dull.

Scrap

Gradual raising of dealers' bids fails to attract material. Dealers are selling conservatively, but making sure of coverage before closing commitments.

Canadian Trade Shows a Better Undertone

TORONTO, Sept. 26.—While general business in the Canadian iron and steel markets holds little promise for immediate improvement, there is a better undertone which is expected to be reflected in more active buying before the close of the year. The Algoma Steel Corpn. has resumed operations at Sault Ste. Marie, Ont. Both the 18-in. and 12-in. merchant mills are in operation, together with open-hearth furnaces, blooming mill and one blast furnace. The Steel Co. of Canada, Ltd., is working at about 25 per cent of capacity on spot orders.

Pig Iron

While there has been no general improvement in this market, sales are well sustained. Prices are unchanged.

Scrap

A better market for special grades of iron scrap has developed recently, with consumers buying for spot needs only. No. 1 machinery cast is moving freely, with small holdings in the hands of dealers. Stove plate was more active during the past week or ten days, with a number of sales reported in small lots.

Chicago Steel Production Makes Largest Gain in Months

CHICAGO, Sept. 27.—Steel output in the Chicago district has gained about four points and now stands at 17 per cent of capacity. This is the first upward movement, and incidentally the largest, that has occurred in many months. Soon after the turn of September both sales and specifications for finished steel started to climb slowly and in the last week the rate has been accelerated to the point where added steel-making capacity was forced into use.

Larger releases by automobile manufacturers, active public work and some needs by the railroads and manufacturers of farm machinery are influences back of the increased steel use. Rail releases against old contracts have brought a rail mill into use. It is interesting to note that the best group showing is being made by small independent shops. Some tank business has developed and new projects are in sight.

Malleable and gray iron foundries are now beyond the "better feeling" stage and at least three out of five report an increase in business. The scrap market is presenting some interesting phases. Specialties continue to move up on scattered sales, and reports are current that the leading producer is about to close for heavy melting steel. Tonnages are again moving to local docks in anticipation that boat shipments will move from Chicago to Lake Erie ports.

Pig Iron

September shipments of northern iron are topping those of August by at least 50 per cent and will mark this month as the best since early last spring. Inquiries and sales, some of which are progressing quietly and are for delivery next year, give substantial assurance that the October movement will register further gains. One merchant stack is blowing and another is on intermittently. In the meantime, stocks at furnaces are shrinking.

Cold-Rolled Strip

Output now stands at 8 per cent of capacity, a gain of about two points since the early part of September. Larger releases are expected in the near future from automobile manufacturers.

Rails and Track Supplies

One Chicago district rail mill has resumed operations and will continue to roll into the early part of October on a restricted schedule. There are

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Ingot output in Chicago district has risen from 13 to 17 per cent, the largest gain in months.

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Business is coming from small shops to a greater extent than from major industries.

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September pig iron shipments topping those of August by 50 per cent.

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no outstanding orders, and contracts for the coming year are not rapidly taking shape in so far as sellers are aware. New releases for track supplies are slightly larger because of the extra tonnage that will accompany the rails now being rolled. Track spikes at $2.60 per 100 lb. are showing signs of weakness.

Cast Iron Pipe

This market is beginning to feel the effects of the lateness of the season. Few large projects are up for figures and small jobs are less numerous. Bids at Springfield, Ill., are running above estimates, and this project will therefore be delayed. Cloverdale, Ind., has tabled its plans which called for 200 tons of cast iron pipe. The Sanitary District trustees, Chicago, are still hopeful for a Federal loan, but the trade is growing more doubtful as each day passes. Pekin, Ill., has ordered several carloads of pipe.

Plates

Oil companies are stepping into the market more frequently and tank fabricators are busier. The Globe Oil & Refining Co. has placed 500 tons. Mills have also booked 1500 tons of plates for the tanks ordered by the Consolidated Oil Corpn. Of interest in the railroad field is an inquiry by the Chicago Great Western for 25 caboose car underframes. The Rock Island is doing heavy repair work on a number of locomotives. Plate schedules are the best in many weeks.

Bars

Chicago mills are benefiting from releases by automobile manufacturers and builders of farm machinery. Probably the largest increase in demand is reaching mills from a constantly broadening field of small manufacturing plants. Rail steel bar mill schedules are improving gradually.

Structural Material

Alterations in the picture of this market are few except that prices of fabricated material are highly competitive. Plans are now in Washington for a 6000-ton Federal building for St. Louis. The Mississippi River waterway development will take 1400 tons, and the States of Missouri and Oklahoma are in the market for 2100 tons for bridges. Bids have been thrown out on the bridge at Joliet, Ill., a revised design of the Ottawa bridge has cut off 100 tons.

Sheets

Most current orders reflect the scant size of stocks in the hands of consumers. While there is some interest in fourth quarter needs, the movement is small. Hot mill output has registered a moderate gain.

Wire Products

Gains in shipments are holding, but forward contracting is less active than had been anticipated by sellers. Output of wire rope is not above 10 per cent for the industry as a whole. Fence posts are moving slowly because of competition of the wood product, which sells at a lower price.

Reinforcing Bars

Prices have weakened all along the line following a dip several weeks ago in rail steel bars for road work. The rail steel commodity is now priced from 1.20c. to 1.30c. a lb. and billet bars are quoted from 1.50c. to 1.75c. Illinois road contracts are being let rapidly; fully 500 tons of bars has been purchased. This tonnage will be doubled in the next week to 10 days.

Bolts, Nuts and Rivets

Specifications from the manufacturing trade are increasing and several plants have heavier operating schedules. Jobbers' trade is quiet.

Scrap

There is considerable interest here as to whether the leading producer will enter the market for heavy melting steel. A small lot of heavy melting steel has been taken by a mill at $6, delivered. Prices of specialties gradually move higher on sales to consumers. Price differentials between Chicago and territories to the east are such that a scrap movement by boat from Chicago seems a logical step, and some dealers are considering accumulations for this purpose.

Eastern Pennsylvania Orders Coming from Wider Sources

Aggregate Tonnage in Steel and Pig Iron No Heavier, But More Buyers Are Taking Small Lots

PHILADELPHIA, Sept. 27.—The trade almost unanimously reports an increase in the number of individual orders for pig iron and steel. However, the aggregate of bookings probably is less than that of the preceding week, as most orders are very small. But the greater spread of orders, coming as they do from miscellaneous sources, has been a source of encouragement, for it means that new buyers have come into the market. At the same time, the trade is awaiting further evidence of increased activity in purchases before attempting to picture a permanent upturn.

The Pennsylvania Railroad is understood to be making estimates of requirements for the 1285 all-steel box cars it is to build in its own shop with the $2,000,000 R. F. C. loan. Meanwhile, it is roughly calculated that they will call for about 15,000 tons, of which 9000 tons will be plates and 6000 tons will be shapes and bars. It is said that at least a portion of the cars will be built on old underframes. The Pennsylvania has ordered about 7500 light rolled steel wheels. The Reading Railroad is receiving cost estimates for fabricated material for the 3700 box cars it is to repair. Only 600 tons of plates, rivet requirements and locomotive tires have been placed. It probably will be a week or 10 days before the remaining requirements will be distributed.

Operations remain at 15 per cent of capacity.

Pig Iron

Furnace interests report an increase in orders. They generally call for even less than previous bookings for single lots, but the fact that more buyers have entered the market has given rise to hopes that the improvement will continue. The orders range from 50 to 150-ton lots of foundry iron. The price situation is unchanged, but the domestic market still is disturbed by imports. Reports are current that certain imports have brought only $12, duty paid. The recent arrival at this port of about 10,000 tons of Royal Dutch iron in the Japanese ship Capetown Maru led to reports that the tonnage came from Japan. No such movement has taken place and so far as known there are no Japanese iron shipments in prospect. Japan is an importer rather than an exporter of pig iron, though Japanese exports have been made from time to time.

Plates, Shapes and Bars

An increase in orders relates chiefly to plates and shapes. While the bookings are generally less for each order, they cover a wider range of buyers. The heavier orders come from fabricators.

Sheets

The market remains dull, with prices for some grades unsteady. No business whatever is being received here from the automotive industry. General contractors for the Philadelphia post office have not as yet awarded sheet requirements, estimated at 700 to 800 tons. Specifications for the bulk of the tonnage calls for galvanized iron sheets, of which 250 tons will be No. 20 gage, 225 tons No. 24 gage and 100 tons No. 28 gage.

Imports

Last week's imports at Philadelphia consisted of only 18 tons of steel bars and 22 tons of structural shapes from Belgium.

Scrap

The market is marking time with prices unchanged.

Valley Mills Experience Small, but Definite, Gain in Orders

YOUNGSTOWN, Sept. 27.—Valley mills are at last able to report an improvement in steel orders over the preceding month, following at least six months of unfavorable comparisons. The gain in orders in September over the corresponding August period has amounted to only 5 to 10 per cent, but the fact that the decline has been definitely checked has led to a belief that more substantial improvement will be forthcoming during October. It was also emphasized that most of the recent improvement has come about without the benefit of specifications from the automobile industry, which is definitely planning heavier October production schedules. In fact, releases for a fair tonnage from Michigan consumers are expected during the current week.

The large steel consuming industries in the immediate Valley district are also increasing their requirements somewhat, and specifications from jobbers and small manufacturing consumers are showing steady gains. Pipe mills are enjoying a fair miscellaneous demand, but aggregate tonnage is very light, and there are no indications of further improvement, except possibly in demand for standard pipe.

Production schedules in the Valleys are still rather spotty, but steel ingot output seems to be definitely increasing. During the current week operations in the Valleys and northern Ohio, outside of Cleveland, may reach 16 to 17 per cent, although such estimates are subject to revision at midweek. Sheet mill schedules are also a little stronger, but strip steel production still varies rather sharply from week to week. Pipe mills are engaged at about 10 per cent of capacity, but tin plate schedules present a favorable contrast with about 50 per cent of the district's capacity in production. This represents an unseasonal increase over the first half of the month.

Prices are comparatively stable on all products, except sheets and strip steel. Sheet consumers have been able to get material at $1 to $2 a ton under asking prices for several weeks, but lower quotations are generally being withdrawn, and sales at lower levels are expected to be completely eliminated after Oct. 1. Hot-rolled annealed sheets will then be quotable at 2.20c., Pittsburgh; galvanized at 2.85c.; automobile body at 2.75c., and light and heavy cold-rolled at 2.60c. and 2.10c., respectively. Shading on strip has been confined largely to cold-rolled material, which has been available to larger buyers at 1.90c., Pittsburgh. The 2c. quotation has applied on small-lot sales. On hot-rolled strip a minimum of 1.45c., Pittsburgh, has been fairly well maintained. Bars and plates are particularly well held at 1.60c., Pittsburgh, and no deviations on wire and nails are reported.

The market on raw materials has considerable strength, especially on semi-finished steel. Billets, slabs and sheet bars are not available at less than $26, Youngstown, and consumers have covered for the fourth quarter at that level. Pig iron is quiet, although Valley furnaces are shipping more than they did in August. The scrap market has again developed considerable strength, largely because of the heavier purchases in the Cleveland district. One mill was recently able to purchase No. 1 heavy melting steel at $9.50, but this price cannot be duplicated today. Hydraulic compressed sheets continue strong because of the limited supply in Detroit.

Cleveland Trade Gaining in Small, Miscellaneous Orders

Diversification of Business Is the Feature Rather Than the Aggregate Tonnage—Ingot Output Steady

CLEVELAND, Sept. 27.—Business in nearly all finished steel products showed a little further gain during the past week. Not only were orders somewhat more numerous, but the average size was slightly larger. Orders were of a miscellaneous character from widely diversified sources. Metal-working industries in this territory generally are showing more activity than a few weeks ago, although the gain is very moderate. New demand from the motor car industry is confined to small lots. Some new business in tin plate and tin mill black plate has come from the can and kitchenware makers.

Cleveland has taken the first step toward an extensive enlargement of its water works system and has authorized three water main extensions, one requiring 9500 ft. of 36-in. steel pipe, taking 900 tons of plates and the others taking 550 tons of cast pipe. New inquiry for fabricated steel is very light. Buying by railroads is still meager.

Steel ingot output in Cleveland is unchanged for the third week at 23 per cent of capacity.

Some of the mills that had not yet announced fourth quarter prices have reaffirmed third quarter quotations. However, little interest is shown in fourth quarter contracts. With several sheet mills holding to the prices they have named for the coming quarter, the sheet market has a firmer tone, although the lower prices in the recently prevailing range of quotations have not disappeared. Cold-rolled strip is also firmer, although a good-lot buyer probably could still secure a 1.90c., Cleveland, quotation.

Pig Iron

Sales improved the past week, during which Cleveland interests booked 10,000 tons in foundry and malleable iron, including a few 500-ton lots. Not much inquiry is pending. Shipments in September will show a gain of about 20 per cent over those of August. The heating industry continues the best source of demand. A small tonnage for the Fox Furnace plant at Elyria, Ohio, was included in the recent large purchase by the American Radiator & Standard Sanitary Corpn. Orders from the motor car industry, while still light, show a slight improvement. Conditions with jobbing foundries in this territory have improved slightly, if at all. There is no change in the price situation.

Bolts and Nuts

Business from jobbers and miscellaneous users has shown a moderate increase this month over that of August. However, this has been offset by a decline in the demand from the motor car industry so that the total volume of business in September will show little change as compared with last month. The price is being well maintained, the weakness of a few weeks ago having almost disappeared.

Strip Steel

Miscellaneous orders for hot-rolled strip increased somewhat during the week and some new business in small lots came from automobile accessory manufacturers. The price is firm. Cold-rolled strip is very quiet. While there is not enough business to test prices, the market is firmer. Several producers are holding to 2c., Cleveland, although the 1.90c. price has not disappeared for good orders.

Sheets

There was a little gain in miscellaneous orders during the past week and some business in small lots for early shipment came from the motor car manufacturers. This industry, however, has not yet made any large purchases for the manufacture of new models of cars. Some new business in tin plate and tin mill black plate came from the canning industry. Demand remains slack from stove, refrigerator and barrel makers. A few consumers have placed fourth quarter contracts. There is little change in the price situation. While several producers are holding to 2.20c. for No. 24 hot-rolled annealed sheets, the 2.10c. price has not disappeared.

Bars, Plates and Shapes

The Cincinnati post office, requiring 4230 tons, has been placed. Other structural business is confined to small lots, mostly public work, although a local industrial building requiring 50 tons was placed. A few small post offices requiring lots of less than 100 tons are pending. Toledo has taken bids for a mooring basin requiring 500 to 600 tons of steel sheet piling. Miscellaneous orders for merchant bars show a slight increase, but reinforcing bars are dull. Shapes and plates are also moving a little better to manufacturing consumers. Prices are firm at 1.65c., Cleveland, for bars and 1.60c., Pittsburgh, for plates and shapes.

Scrap

The large scrap purchase by the National Tube Co. for its Lorain works has tended to improve sentiment although Cleveland dealers did not participate in this business. A Youngstown district consumer during the week bought a small tonnage of No. 2 heavy melting steel at $8.50 to $8.75 and some No. 1 busheling and compressed sheet steel. While prices appear fairly firm, the market has a slightly easier tone now that demand from dealers to cover against recent Youngstown orders has subsided.

St. Louis Pig Iron Trade Gaining; Scrap Firm

ST. LOUIS, Sept. 27.—Manufacturers of oil well supplies came into the market this week and bought 1000 tons of foundry pig iron from the local maker. Stove plants continue to be the chief melters in the district, and have been specifying heavily against their contracts for pig iron. In addition to mail order business, there have been several large export orders, notably one for 102 ranges for Hawaii. Business with malleable plants catering to the automotive trade is extremely light. Shipments of the St. Louis Gas & Coke Corpn. for September are ahead of those of August. Prices are unchanged.

Steel

After several weeks of activity in structural steel awards there has been another dull period. Business generally in plates, shapes and bars has been very quiet, although the price structure remains firm. The St. Louis County Gas & Electric Co. is in the market for 170 tons of plates for a gas tank.

Scrap

A round tonnage of heavy melting steel, rails and specialties is reported to have been bought by an East Side mill. A sale of railroad malleable was also reported at a price that warranted dealers in increasing their price 25c. a ton. Railroad lists: Chicago, Milwaukee, St. Paul & Pacific, 48 carloads; Mobile & Ohio, 27 carload; New York, Chicago & St. Louis, 23 carloads.

Detroit Scrap Market Quiet but Firm

DETROIT, Sept. 27.—Although the local scrap market has not made further gains, it is holding its own, with dealers marking time pending mill buying. The district steel plant purchased a round tonnage of melting steel and hydraulic bundles the past week. Prices are firm and unchanged.

New York District Steel Orders Gain Moderately

September Totals Above Those of August, Though Decline in Tin Plate Has Affected Some Companies

NEW YORK, Sept. 27.—Most of the local steel sales offices have experienced moderate gains in orders this month as compared with August. The increases, though small, have been fairly consistent and have not included any outstanding tonnage. A few companies whose sales totals earlier in the month were aided by tin plate releases have not done so well in the past week as in previous weeks of September, but the general situation shows a somewhat healthier tone.

Prices are not a serious issue as to most products, as current levels have been extended through the fourth quarter. Sheets are an exception, there being a strong effort to reestablish the prices that were in effect at the beginning of this quarter, which on many grades are $2 a ton above the quotations that have recently been made on the more attractive orders. Some mills have notified their customers that they will take orders at current prices up to the end of the month for shipment at their convenience but not later than Oct. 15, and sales offices of such companies have had very positive instructions not to depart from this procedure. Cold-rolled strip makers are also taking a firmer price stand and hope to restore the former quotation of 2c., Pittsburgh or Cleveland, which still applies on small lots but which has been shaded $2 a ton or more on desirable tonnages. Plates are being offered at sharp concessions, though most companies adhere firmly to the regular quotation of 1.70c. a lb., Coatesville.

Pig Iron

The American Radiator & Standard Sanitary Corpn. recently closed quietly for approximately 50,000 tons of foundry pig iron for delivery during the next 12 months to its various plants. Contracts for this tonnage are understood to have been placed with domestic furnaces. Other recent transactions that have been quietly consummated, however, are revealed to have involved foreign iron. The American Tube & Stamping Plant, Stanley Works, Bridgeport, Conn., several weeks ago bought 5000 tons of Royal Dutch basic iron, while Manufacturers Iron Foundry, of that city, purchased 500 tons of Royal Dutch foundry iron at about $13.50 a ton, on trucks at Bridgeport. The Malleable Iron Fittings Co., Branford, Conn., which a week ago closed on 1500 tons of malleable, will take one-third Dutch iron. Aside from the purchases of American Radiator and American Tube, the total volume of sales during the past week, at only 3000 tons, reflected a sharp decline from the preceding week's total of 6000 tons. Sporadic gains in foundry melt are evident. Though there is momentarily a paucity of inquiry, sellers are expectant that the American Radiator purchase, as in past instances, will foreshadow a better flow of orders from smaller melters.

Scrap

Buying into consumption is somewhat improved. The American Radiator & Standard Sanitary Corpn. recently purchased moderate tonnages of stove plate and cast scrap. A sizable tonnage of No. 1 heavy melting steel was sold today for water shipment from New York to an eastern Pennsylvania consumer. Prices are maintaining their recent strength, with the list nominally unchanged.

New England Scrap Sales Are Slightly Larger

BOSTON, Sept. 27.—The last reported sale of Dutch pig iron was at $13.75 a ton, delivered. Indian iron is generally $15.50 to $16.50 a ton, on dock here, duty paid. Some eastern Pennsylvania iron is offered at $16.50 a ton, delivered. Buffalo iron is generally quoted at $14 a ton, furnace, and Alabama at $10.50 a ton. All prices relate to No. 2X iron.

Sales of scrap were slightly larger the past week, but business was far from good. Included in the transactions were No. 1 heavy melting steel at $3.50 a ton, on cars, shipping point, breakable cast at $4.25 a ton, engine blocks at $2.50 to $2.75 a ton, and No. 1 machinery cast at $4.75 to $5, all for Pennsylvania delivery. The buying has been spotty and does not represent any general improvement in demand.

Pacific Coast Steel Jobs Mostly Public Work

SAN FRANCISCO, Sept. 26.—Federal, State and municipal projects continue to furnish practically all the tonnage on both contracts and inquiries. The number of these projects promises to increase during the next several months. Practically no major private building construction is in immediate prospect.

Steel mills and jobbers report that the volume of business is slightly improved over the low summer months and that October will probably show continued though small gains.

Major tonnage reported awarded for the week was in excess of 3000 tons, with new inquiries for approximately 1200 tons of bars and structural shapes. No plate projects of major proportions have been reported for several months. Sheets and cast iron pipe have been especially dull.

Buffalo Pig Iron Sales in Larger Tonnages

BUFFALO, Sept. 27.—The recent large purchase by the American Radiator & Standard Sanitary Corpn. has given an impetus to the pig iron market, with the consequence that prices in the East are on a firmer basis. In addition to the 50,000-ton purchase of the Radiator company, about 50,000 tons has been purchased by other consumers in the past three weeks. The carload inquiry has for the time being disappeared, with larger lots being sought. Foundry melt has improved, with some plants running five days a week. Prices in the East show a firming tendency. More interest is apparent among foundries operating in automobile manufacturing territories.

Steel

The Lackawanna plant of Bethlehem is operating three open-hearths. This is the idle week at the Republic plant. Wickwire Spencer Steel Co. has one open-hearth in service. A local structural steel fabricator has taken a 170-ton bridge at Sparrowbush, N. Y.; a 180-ton bridge at North Creek, N. Y., and a 300-ton bridge at Ausable Chasm. All are for the State of New York.

Scrap

The market is marking time following the recent orders for No. 2 heavy melting steel. It is understood that in addition to the 5000 tons of No. 2 heavy melting steel for barge shipment, mentioned last week, a further purchase was made by the same concern of 2000 to 3000 tons locally. No. 1 machinery cast and stove plate are particularly strong.

Erie Railroad has placed orders for 900,000 spring washers with the Reliance Mfg. Co., Massillon, Ohio; National Lock Washer Co., Newark, N. J.; Woodling's Forge & Tool Co., Verona, Pa., and Hubbard & Co., Pittsburgh.

Fabricated Structural Steel

Awards in Better Volume—New Projects Also Higher

INCLUDING 4200 tons for a post office in Cincinnati and 2300 tons for bridges in Buffalo and Pepin counties, Wisconsin, lettings total 15,200 tons, compared with 11,300 tons a week ago. Public works account for the bulk of awards. New projects of 18,400 tons are the largest since the last week in August. Outstanding inquiries are 6000 tons for a Federal building in St. Louis, for which plans have gone to Washington for approval, and 3500 tons for a post office in St. Paul. Plate contracts call for 2450 tons. Awards follow:

NORTH ATLANTIC STATES

South Boston, 104 tons, public works garage, to New England Structural Co.

State of New York, 650 tons, highway bridges; Sparrow Bush, 170 tons; North Creek, 180 tons; Ausable Chasm, 300, all to Lackawanna Steel Construction Corpn.

Crawford County, Pa., 100 tons, State bridge, to Kellogg Structural Steel Co.

Middleburg, N. Y., 390 tons, school, to unnamed fabricator.

Owego, N. Y., 400 tons, Erie Railroad bridge, to American Bridge Co.

Reading, Pa., 100 tons, hosiery mill, to Bauman Iron Works, Reading.

Merchantsville, N. J., 120 tons, Pennsylvania Railroad bridge, to McClintic-Marshall Corpn.

SOUTH AND SOUTHWEST

Craven County, N. C., 115 tons, State highway bridge, to Dewey Brothers, Goldsboro, N. C.

Munroe, La., 200 tons, post office, to Jones & Laughlin Steel Corpn.

Davis, Okla., 285 tons, highway bridge, to Kansas City Structural Steel Co.

Strong City, Okla., 670 tons, highway bridges, to Missouri Valley Bridge & Iron Co.

CENTRAL STATES

Cincinnati, 4200 tons, post office, to McClintic-Marshall Corpn.

Detroit, 325 tons, under-pass for New York Central Railroad, to Whitehead & Kales Co.

Chicago, 700 tons, State group at World's Fair, to Midland Structural Steel Co.

State of Wisconsin, 360 tons, highway bridges; 190 tons to Milwaukee Bridge Co., and 170 tons to unnamed fabricators.

State of Wisconsin, 2300 tons, Buffalo and Pepin county bridges; No. 2, 1000 tons, to Worden-Allen Co.; Nos. 3, 4 and 5, 600 tons, to Industrial Contracting Co., Minneapolis; Nos. 6, 7 and 8, 600 tons, to American Bridge Co.; No. 1, 100 tons, to Minneapolis Bridge Co.

Pulaski County, Mo., 450 tons, highway bridge, to Stupp Brothers Bridge & Iron Co.

McPherson, Kan., 500 tons, tower shells, to Graver Corpn.

Henderson County, Ill., 290 tons, State highway bridges, to Illinois Steel Bridge Co.

State of Nebraska, 930 tons, highway bridges, to Omaha Steel Co. and St. Joseph Structural Steel Co.

Webster County, Iowa, 210 tons, highway bridge, to Des Moines Steel Co.

WESTERN STATES

Los Angeles County, Cal., 175 tons, Del Amo Avenue bridge over Los Angeles River, to Consolidated Steel Corpn.

Pasadena, Cal., 120 tons, Pine Canyon dam gate structures, to Consolidated Steel Corpn.

Castiac, Cal., 775 tons, Piru Creek State highway bridges, to McClintic-Marshall Corpn.

Alameda, Cal., 780 tons, structures for Government Island base, to McClintic-Marshall Corpn.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Wellesley, Mass., 750 tons, State bridge.

Portland, Me., 700 tons, post office; bids Oct. 17.

Ithaca, N. Y., 100 tons, two fraternity houses.

Stamford, Conn., 350 tons, highway bridge.

State of New Jersey, 2300 tons, bridge over Hackensack River at Rutherford and Secaucus, route 3, section 2; bids Oct. 17.

Orangeburg, N. Y., 500 tons, State hospital building.

Philadelphia, 6000 tons, customshouse; bids probably will be delayed owing to appeal from award of Board of View.

Philadelphia, 400 tons, Friedenberg Memorial Hospital addition; bids opened Sept. 27.

Springdale, Pa., 250 tons, lock for United States Engineer, Pittsburgh.

Williamsport, Pa., 100 tons, post office; bids opened Sept. 26.

Atlantic City, N. J., 500 tons, post office; plans out soon.

Wilmington, Del., 500 tons, post office; plans out soon.

Baltimore, 500 tons, high school.

SOUTH AND SOUTHWEST

London, W. Va., 2100 tons, lock in Kanawha River for United States Engineer, Charleston, W. Va.

State of Oklahoma, 100 tons, highway bridges.

CENTRAL STATES

St. Paul, Minn., 3500 tons, superstructure for post office; bids to be taken in October.

Alma, Wis., 1100 tons, lock No. 4 in Mississippi River for United States Engineer, Rock Island, Ill.; bids Oct. 15.

St. Louis, 6000 tons, Federal building; plans at Washington for approval.

Canton, Mo., 240 tons, lock No. 20 in Mississippi River for United States Engineer, St. Louis.

WESTERN STATES

Albany County, Wyo., 157 tons, Laramie River State highway bridge; bids closed Sept. 27.

State of Oregon, 156 tons, State highway bridges in three counties; bids closed Sept. 28.

Honolulu, T. H., 300 tons, Federal immigration station; bids close Nov. 15.

FABRICATED PLATE

AWARDS

Plymouth, Mass., 100 tons, standpipe and tank, to Chicago Bridge & Iron Co.

Philadelphia, 100 tons, boilers for Continental Diamond Fiber Co., to McCarter Iron Works, Norristown.

Washington, 170 tons, army barges, to Dravo Contracting Co.

Houston, Tex., 1320 tons, three 118,000-bbl. tanks for Shell Petroleum Co., to Chicago Bridge & Iron Co.

Gasconade, Mo., 160 tons, three launches for United States Engineer's office, to Nashville Bridge Co.

Wichita, Kan., 500 tons, bubble towers for Globe Oil & Refining Co., to American Tank & Equipment Co., Kansas City.

McPherson, Kan., 100 tons, to boilers for Globe Oil & Refining Co., to Heine Boiler Co.

NEW PROJECTS

Cleveland, 1000 tons, 36-in. pipe for water main extension.

Memphis, Tenn., 350 tons, pipe pontoon; bids being taken.

St. Louis, 170 tons, gas storage tank for St. Louis County Gas & Electric Co.

Cast Iron Pipe

Plymouth, Mass., has awarded 1400 tons of 6-, 8- and 10-in. pipe to Warren Foundry & Pipe Co.

Latham Water District, Colonie, N. Y., opened bids Sept. 22 on 150 tons of 6-, 8- and 10-in.

State of New York will take bids on about 200 tons of 3- to 16-in. for water line at Poughkeepsie.

State of New York will open bids Oct. 19 on 800 tons of 2- to 30-in. for Harlem Valley State Hospital, Wingdale.

Buffalo has opened bids on 100 tons of 60-in.; United States Pipe & Foundry Co. is low bidder.

United States Marine Hospital project at Stapleton, N. Y., will require 225 tons of 12-in. and smaller.

Lake Denmark, N. J., arsenal will open bids Oct. 5 on 150 tons of 6- and 10-in. for Government project.

Hayward, Cal., awarded 130 tons of 12-in. to American Cast Iron Pipe Co.

Seattle has plans for a water pipe line on Alki Avenue, to cost $110,000; also a water supply line from Cedar River, to cost $700,000.

United States Pipe & Foundry Co. was low bidder on 100 tons of 4-, 6- and 8-in. class B at Anaheim, Cal.

Portland, Ore., awarded 200 tons of 30-in. class B to United States Pipe & Foundry Co.

Los Angeles has called bond bids on Oct. 3 for 144 tons of 2-in.

Railroad Equipment

Chicago Great Western is inquiring for 25 underframes for caboose cars.

National Railways of Mexico are in the market for 15 express cars, 10 second-class coaches and four first-class coaches.

Central Aguirre Sugar Corpn., Porto Rico, has purchased 50 15-ton cane cars from Magor Car Corpn. and is understood to have ordered 150 small cane cars from a Belgian manufacturer for delivery, duty free, into Porto Rico.

Bureau of Yards and Docks, Navy Department has purchased a 45-ton gasoline-electric locomotive from the Atlas Car & Mfg. Co.

Navy Department opened bids Sept. 28 for 311 tons of 100-lb. and 244 tons of 80-lb. relaying rail for Sunnyvale, Cal., dirigible base.

Pipe Lines

Citizens Gas Co., Cedar Rapids, Iowa, is considering installation of natural gas pipe line. Cost over $50,000.

Interstate Natural Gas Co., Ferriday, La., plans steel pipe line from pumping station at Ferriday to Foules, La., and vicinity, replacing an existing line.

St. Louis Western Natural Gas Co., 722 Chestnut Street, St. Louis, Herbert S. Hadley, head, plans installation of pipe line for natural gas distribution.

High-temperature tests on manganese-carbon steel, cast nickel-chromium-iron alloys, a series of tungsten-chromium-vanadium steels and a series of molybdenum-chromium-vanadium steels have been run by scientists of the Commerce Department's Bureau of Standards in an effort to determine the behavior of metals under extreme temperatures. The results are published in the September number of the bureau's journal.

Large Copper Purchase by Westinghouse Features Otherwise Dull Metal Market

NEW YORK, Sept. 27.—Announcement yesterday of a 2000-ton purchase of copper by Westinghouse Electric & Mfg. Co. offered probably the only bright spot against a background of a dull copper market during the past week. The American Radiator & Standard Sanitary Corpn. several weeks ago purchased 400 to 500 tons, representing its 1933 requirements of copper. These purchases are viewed by certain factors in the trade as favorable indications as to early future trends in the price of copper. That important consumers of copper have covered against future requirements at prices understood to be between 6c. and 6.25c., delivered, has strengthened belief in the trade that the probability of lower copper prices, at least for the early future, is waning. Further proof of this contention, it is pointed out, may be emphasized by the unwavering resistance to lower levels that has featured the electrolytic delivered price of 6.25c. a lb. during the extremely quiet market of the past three weeks. Though scattered outside lots have been offered at concessions, such offerings have failed to affect adversely the strong price position maintained by the leading producers and smelters. Trading in European markets during the week has been fairly quiet, with offerings there ranging from 5.90c. to 6.15c. Copper Exporters, Inc., continues to post 6.25c., delivered usual foreign ports, but sales at that price are of a minor character. Lake copper is dull and quotably unchanged at 6.37½c., delivered.

Tin

Consumer buying shrunk to negligible proportions during the past week, probably as a result of well covered positions for actual tin requirements and disinclination of buyers to consider further purchasing until the new tin plate price is announced. The New York price of tin was fairly steady throughout the week, with today's quotation of 24.50c. a lb. comparing with 24.35c. a week ago. London prices today were slightly higher than a week ago, with spot standard at £151 10s. a ton, future standard at £152 12s. 6d. and spot Straits at £157. Today's Singapore quotation of £158 5s. was £5 higher than that of last Tuesday. United Kingdom warehouse stocks on Sept. 24 were 31,698 tons, a decrease of 257 tons from the previous total. Shipments from the Straits up to and including Sept. 24 amounted to 3395 tons.

Lead

With demand at a low point, the principal Eastern factor instituted during the week two reductions, totaling $4 a ton, in its contract basing price, which is now posted at 3.30c. a lb.. New York. The leading Midwestern producer has established its position at 3.25c. a lb., St. Louis, although at this price it is not an active competitor. A fair amount of October lead is still to be purchased, but little buying is looked for until lead prices reflect greater stability. Current bookings, as a consequence, are restricted to inconsequential lots.

Zinc

Activity in this market reflects the quietness prevailing in other nonferrous metals. Consumers are substantially covered for early needs, and the running volume of sales is extremely small. Producers, however, are maintaining firm price views, with the markets well established at 3.25c., East St. Louis, or 3.62c., New York, for delivery through October. A 100-ton lot of resale metal, which has been offered at 3.20c., East St. Louis, has failed to interest consumers.

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The Week's Prices. Cents Per Pound for Early Delivery

	Sept. 21	Sept. 22	Sept. 23	Sept. 24	Sept. 26	Sept. 27
Lake copper, New York	6.37½	6.37½	6.37½	6.37½	6.37½	6.37½
Electrolytic copper, N. Y.*	6.00	6.00	6.00	6.00	6.00	6.00
Straits tin, spot, N. Y.	24.65	24.80	24.85	....	24.65	24.50
Zinc, East St. Louis	3.25	3.25	3.25	3.25	3.25	3.25
Zinc, New York	3.62	3.62	3.62	3.62	3.62	3.62
Lead, St. Louis	3.25	3.25	3.25	3.25	3.25	3.25
Lead, New York	3.40	3.40	3.40	3.40	3.30	3.30

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.62½c. a lb., New York.
Brass ingots, 85-5-5-5, 6.25c. a lb., New York and Philadelphia.

From New York Warehouse

*Delivered Prices, Base per Lb.**

Tin, Straits pig	26.50c. to 27.50c.
Tin, bar	28.50c. to 30.50c.
Copper, Lake	7.75c. to 8.75c.
Copper, electrolytic	7.50c. to 8.50c.
Copper, casting	7.25c. to 8.25c.
*Copper sheets, hot-rolled	15.37½c.
*High brass sheets	12.50c.
*Seamless brass tubes	15.25c.
*Seamless copper tubes	14.37½c.
*Brass rods	10.25c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.00c. to 4.50c.
Lead, bar	5.50c. to 6.50c.
Lead sheets	8.00c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.	16.00c.
Solder, ½ and ½	15.75c. to 16.75c.
Babbitt metal, commercial grade	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	27.75c.
Tin, bar	29.75c.
Copper, Lake	7.25c.
Copper, electrolytic	7.25c.
Copper, casting	6.875c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	4.00c. to 4.25c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	32.00c.
Solder, ½ and ½	17.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	4.625c.	5.375c.
Copper, hvy. and wire	4.50c.	5.25c.
Copper, light and bottoms	3.625c.	4.25c.
Brass, heavy	2.50c.	3.00c.
Brass, light	2.00c.	2.50c.
Hvy. machine composition	3.50c.	4.25c.
No. 1 yel. brass turnings	2.75c.	3.125c.
No. 1 red brass or compos. turnings	3.00c.	3.75c.
Lead, heavy	2.50c.	2.875c.
Zinc	1.375c.	1.75c.
Cast aluminum	2.75c.	4.25c.
Sheet aluminum	6.50c.	8.00c.

Reinforcing Steel

Awards 2600 Tons—New Projects 1900 Tons

AWARDS

Boston, 400 tons, school to Northern Steel Co.

Suffolk County, N. Y., 250 tons, barmats, highway construction at Coram-Middle Island, to Concrete Steel Co.

State of Illinois, 500 tons, road work, to various bidders.

State of New York, 200 tons, mesh, road construction, Port Henry-Westport, to American Steel & Wire Co.

State of Illinois, 130 tons, road work, to Concrete Engineering Co.

Cotton Hill, Ill., 1000 tons, bridge, to Laclede Steel Co. and Missouri Rolling Mill Corpn.

NEW REINFORCING BAR PROJECTS

Wellesley, Mass., 250 tons, State road.

Malverne, N. Y., 100 tons, high school.

State of New Jersey, 150 tons, bascule span, route 3, section 2; bids Oct. 17.

Bergen County, N. J., 750 tons, State highway; Eisenberg & Son, Camden, N. J., general contractors.

Burlington County, N. J., 350 tons, State highway; Eisenberg & Son, Camden, general contractors.

Santa Monica, Cal., 166 tons, Topanga Creek State highway bridge; bids close Oct. 13.

Raymond, Wash., 120 tons, Willapa River State highway bridge; bids close Oct. 4.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
Del'd Philadelphia .....1.91c.
Del'd New York .....1.95c.
Del'd Detroit .....1.80c.
F.o.b. Cleveland .....1.65c.
F.o.b. Lackawanna .....1.70c.
F.o.b. Birmingham .....1.75c.
C.i.f. Pacific ports .....2.10c.

Billet Steel Reinforcing
(as quoted by distributers)

F.o.b. P'gh mills, 40, 50, 60-ft....1.60c.
F.o.b. Birmingham, mill lengths....1.75c.
F.o.b. Cleveland .....1.60c. to 1.75c.

Rail Steel

F.o.b. mills, east of Chicago dist. .....1.35c. to 1.45c.
F.o.b. Chicago Heights mills.....1.50c.

Iron

Common iron, f.o.b. Chicago.....1.60c.
Refined iron, f.o.b. P'gh mills.....2.75c.
Common iron, del'd Philadelphia....2.11c.
Common iron, del'd New York.....2.15c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
F.o.b. Birmingham .....1.75c.
Del'd Cleveland .....1.8035c.
Del'd Philadelphia .....1.7935c.
F.o.b. Coatesville .....1.70c.
F.o.b. Sparrows Point.....1.70c.
Del'd New York .....1.889c.
C.i.f. Pacific ports.....2.00c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
F.o.b. Birmingham .....1.75c.
F.o.b. Lackawanna .....1.70c.
F.o.b. Bethlehem .....1.70c.
Del'd Cleveland .....1.8035c.
Del'd Philadelphia .....1.7495c.
Del'd New York .....1.86775c.
C.i.f. Pacific ports (standard).....2.10c.
C.i.f. Pacific ports (wide flange)....2.20c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh .....1.90c.
F.o.b. Chicago mill .....2.05c.
F.o.b. Buffalo .....2.00c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....1.70c.
Bars, f.o.b. Chicago.....1.75c.
Bars, Cleveland .....1.75c.
Bars, Buffalo .....1.75c.
Bars, Detroit .....1.90c.
Bars, eastern Michigan.....1.95c.
Shafting, ground, f.o.b. mill..... .....†2.05c. to 3.00c.

*In quantities of 10,000 to 19,999 lb.
†According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

Base per Lb.

No. 10 f.o.b. Pittsburgh .....1.55c.
No. 10 f.o.b. Chicago mill .....1.65c.
No. 10 del'd Philadelphia .....1.86c.
No. 10 f.o.b. Birmingham .....1.70c.
No. 10, c.l.f. Pacific Coast ports..2.17½c.

Hot-rolled and Annealed

No. 10, Pittsburgh .....1.70c.
No. 10, Chicago mills .....1.80c.
No. 10, Birmingham .....1.85c.
No. 10, Pacific Coast ports.....2.32½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh ...2.10c. to 2.20c.
No. 24, f.o.b. Chicago mills..2.20c. to 2.30c.
No. 24, del'd Philadelphia..2.46c. to 2.51c.
No. 24, f.o.b. Birmingham ..2.25c. to 2.35c.
No. 24, c.l.f. Pacific Coast ports....2.85c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh .....2.15c. to 2.25c.
No. 10 gage, f.o.b. Chicago mills .....2.25c. to 2.35c.
No. 10, gage, del'd Philadelphia .....2.46c. to 2.56c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh .....2.60c. to 2.75c.
No. 20 gage, f.o.b. Chicago mills .....2.70c. to 2.85c.
No. 20 gage, del'd Philadelphia .....2.91c. to 3.06c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....2.75c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh...2.55c. to 2.65c.
No. 20, f.o.b. Pittsburgh...3.05c. to 3.15c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh..2.75c. to 2.85c.
No. 24, f.o.b. Chicago mills..2.85c. to 2.95c.
No. 24, del'd Philadelphia..3.06c. to 3.16c.
No. 24, f.o.b. Birmingham..2.90c. to 3.00c.
No. 24, c.l.f. Pacific Coast ports....3.50c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh .....2.80c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh...2.50c. to 2.60c.
No. 20, f.o.b. Pittsburgh...3.00c. to 3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh...2.30c. to 2.40c.
No. 28, Chicago mill .....2.40c. to 2.50c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mill $4.75
Standard cokes, f.o.b. Gary..... 4.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50
15-lb. coating I.C. 12.00
20-lb. coating I.C. 13.00
25-lb. coating I.C. 14.10
30-lb. coating I.C. 14.90
40-lb. coating I.C. 16.70

Hot-rolled Hoops, Bands and Strips

Base per Lb.

All widths up to 24 in., Pittsburgh.. .....1.45c. to 1.50c.
All widths up to 24 in., Chicago.... .....1.55c. to 1.60c.
Cooperage stock, P'gh.....1.55c. to 1.60c.
Cooperage stock, chicago...1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh .....1.90c. to 2.00c.
F.o.b. Cleveland .....1.90c. to 2.00c.
Del'd Chicago .....2.20c. to 2.30c.
F.o.b. Worcester .....2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....2.75c. to 2.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire .....2.20c.
Spring wire .....3.20c.

To Jobbing Trade

Base per Keg

Standard wire nails.....$1.95
Smooth coated nails 1.95
Galvanized nails 3.95

Base per Lb

Smooth annealed wire.....2.35c.
Smooth galvanized wire.....2.80c.
Polished staples .....2.50c.
Galvanized staples .....2.75c.
Barbed wire, galvanized.....2.60c.
Woven wire fence No. 9 gage, per net ton $55.00
Woven wire fence, No. 12½ gage and lighter, per net ton..... 60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	51½	28½	⅛	+95	+142½
¼	62	49½	¼	+5	+29½
⅜ to ⅝	57	34	⅜ & ½	28	10½
½	62	49½	¾	33	16½
¾	65½	55	1	36	20½
1 to 3	67½	57	1¼ to 1½	40	23
			2	38	21

Lap Weld

2	61	50½	2	26	12½
2½ to 6	64½	54	2½ to 3½	33	18½
7 and 8	62	51	4 to 6	35	22
9 and 10	60	49	7 and 8	34	21½
11 and 12	59	48	9 to 12	31	16½

Butt Weld, extra strong, plain ends

⅛	48	33	⅛	+17	+49½
¼ to ⅜	53½	38½	¼ & ⅜	+7	+41
½	59	49½	½	28	12½
¾	63½	54	¾	33	17½
1 to 1½	65½	56	1 to 2	39	23
2 to 3	66½	57			

Lap Weld, extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½ to 4	39	25
4½ to 6	62	52½	4½ to 6	38	24
7 to 8	58	47	7 & 8	36	22
9 and 10	51½	40½	9 to 12	26	13½
11 and 12	50½	39½			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes
Cold-Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the abve base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages takes the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30% base (carloads) 55
Carbon, 0.30% to 40% base..... 50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

Per Gross Ton

Standard, f.o.b. mill.....$43.00
Light (from billets), f.o.b. mill.... 33.00
Light (from rail steel, f.o.b. mill) $28.00 to $30.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16-in. and large.....$2.60
Spikes, ½-in. and large..... 2.60
Spikes, boat and barge..... 2.60
Tie plate, steel..... 1.85
Angle bars 2.75
Track bolts, to steam railroads..... 3.50
Track bolts, to jobbers, all sizes, per 100 count.....73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

†Machine bolts 75
†Carriage bolts 75
Lag bolts 75
Plow bolts, Nos. 1, 2, 3 and 7 heads.. 75
Hot-pressed nuts, blank or tapped, square 75
Hot-pressed nuts, blank or tapped, hexagons 75
C.p.c. and t. square or hex nuts, blank or tapped 75
Washers*...7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts 75
Semi-finished hexagon castellated nuts, S.A.E. 75
Stove bolts in packages, P'gh, 77½, 25 and 10
Stove bolts in packages, Ch'go, 77½, 25 and 10
Stove bolts in pkgs., Cleveland, 77½, 25 and 10
Stove bolts in bulk, P'gh..... 80
Stove bolts in bulk, Chicago..... 80
Stove bolts in bulk, Cleveland..... 80
Tire bolts.....60 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

Base per Lb.

F.o.b. Pittsburgh or Cleveland.....$2.25
F.o.b. Chicago 2.35

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70, 10 and 5
F.o.b. Cleveland .....70, 10 and 5
F.o.b. Chicago .....70, 10 and 5

Cap and Set Screws

Discounts to Jobbers

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....80 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller...75 and 10
Milled headless set screws, cut thread, ⅜ in. and smaller.....75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller .....80, 25 and 10
Upset set screws, sq. head, 1 in. dia. and smaller .....75, 10 and 10
Upset set screws, 1⅛ in. and larger, 75 and 10
Milled studs 70

SEMI-FINISHED STEEL

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and under 10-in., Pittsburgh $36.00
Rerolling, 4-in. and under 10-in., Youngstown 36.00
Rerolling, 4-in. and under 10-in., Cleveland 36.00
Rerolling, 4-in. and under 10-in., Chicago 29.50
Forging quality, Pittsburgh..... 33.00
Forging quality, Youngstown..... 33.00

Sheet Bars

(Open-Hearth or Bessemer)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

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(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.00
Furnace, f.o.b. Connellsville prompt	$2.75 to 4.25
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b., ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.20 to $1.30
Mine run coking coal, f.o.b. W. Pa.	1.30 to 1.40
Gas coal, ¾-in., f.o.b. Pa. mines	1.30 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.40
Steam slack, f.o.b. W. Pa. mines	0.50 to 0.65
Gas slack, f.o.b. W. Pa. mines	0.50 to 0.65

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	2.75c.
No. 5 industrial fuel oil	2.45c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.00c.
No. 4 industrial	4.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 High-heat Duty Brick	f.o.b. Works Intermediate Duty Brick
Penn.	$35.00	$25.00 to $30.00
Maryland	35.00	25.00 to 30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	25.00 to 30.00
Kentucky	35.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	35.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$38.40 to $41.40
4-in., del'd Chicago	41.40 to 44.40
6-in., and larger, del'd New York	31.30
4-in., del'd New York	34.30
6-in., and larger, Birm'ham	$32.00 to 33.00
4-in., Birmingham	35.00 to 36.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$13.50
Bessemer	15.00
Gray forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.25 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent.	23.67
Bess. ferrosil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	$18.30 to 18.80
Southern No. 2 fdy. del'd.	14.56
Northern malleable, del'd.	18.30 to 18.80
Northern basic, deliv'd.	18.30 to 18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east N. J.	$17.41 to $17.66
East Pa. No. 2 fdy.	15.02 to 15.52
East Pa. No. 2X fdy.	15.52 to 16.02

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

* Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd.	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.05
*Buffalo, sil. 2.25 to 2.75	19.05
†Buffalo, sil. 1.75 to 2.25	17.41
†Buffalo, sil. 2.25 to 2.75	17.41
†Ala., sil. 1.75 to 2.25	15.64
†Ala., sil. 2.25 to 2.75	16.14

Freight rates: $5.05 all rail from Buffalo, and $3.41 to $3.91 rail and water from Buffalo when $1 barge and $2 to $2.50 New England freight rate are obtainable; $5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$13.84 to $14.34
East. Pa. No. 2X	14.34 to 14.84
East. Pa. No. 1X	14.84 to 15.34
Basic (del'd east. Pa.)	13.50 to 14.00
Malleable	16.50 to 16.00
Stand. low phos. (f.o.b. east. Pa. furnace)	20.50 to 21.50
Cop. b'r'g low phos. (f.o.b. furnace)	20.50 to 21.50
Va. No. 2	21.79
Va. No. 2X	22.29
Va. No. 2 plain	21.54 to 22.04
Va. No. 2X	22.04 to 22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces: $4.67 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$15.00
S'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent.	21.87
Stand. low. phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$25.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (less carloads)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b.) Welland, Ont., in carloads	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to $1.20
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c
Ferrochromium, 2% carbon	17.00c to 17.50c
Ferrochromium, 1% carbon	19.00c to 20.00c
Ferrochromium, 0.10% carbon	23.50 to 25.00c
Ferrochromium, 0.06% carbon	25.50c to 27.00c
Ferrovanadium, del., per lb. contained Va.	$3.05 to $3.30
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$3 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68½% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	21c. to 22c.

	Per Gross Ton
Tungsten, Chinese wolframite	$10.75 to $11.00
Tungsten, domestic scheelite	$10.00 to 10.50
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic seaboard	18.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	20.00

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines	$10.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.50 to $10.00
No. 2 heavy melting steel	8.00 to 8.50
No. 2 railroad wrought	9.50 to 10.00
Scrap rails	9.50 to 10.00
Rails 3 ft. and under	10.50 to 11.00
Sheet bar crops, ordinary	10.00 to 10.50
Compressed sheet steel	9.00 to 9.50
Hand bundled sheet steel	8.00 to 8.50
Hvy. steel axle turnings	7.50 to 8.00
Machine shop turnings	6.00 to 6.50
Short shov. steel turnings	6.00 to 6.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.50 to 10.50
Railr. knuckles and couplers	10.00 to 10.50
Rail. coil and leaf springs	10.00 to 10.50
Rolled steel wheels	10.00 to 10.50
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	11.50 to 12.00
Low phos. plate scrap	10.50 to 11.00
Low phos. punchings	10.50 to 11.00
Steel car axles	11.00 to 11.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$6.00 to $6.50
Shoveling steel	6.00 to 6.50
Frogs, switches and guards	$6.00 to $6.50
Hydraulic comp. sheets	4.25 to 4.75
Drop forge flashings	4.00 to 4.50
No. 1 busheling	4.00 to 4.50
Rolled carwheels	8.00 to 8.50
Railroad tires	7.50 to 8.00
Railroad leaf springs	8.00 to 8.50
Axle turnings	4.50 to 5.00
Steel couplers and knuckles	7.00 to 7.50
Coil springs	8.50 to 9.00
Axle turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	4.00 to 4.50
Short shoveling turnings	4.00 to 4.50
Machine shop turnings	3.00 to 3.50
Rerolling rails	8.00 to 8.50
Steel rails, less than 3 ft.	8.75 to 9.25
Steel rails, less than 2 ft.	9.25 to 9.75
Angle bars, steel	7.00 to 7.50
Cast iron carwheels	7.00 to 7.50
Railroad malleable	6.75 to 7.25
Agricultural malleable	5.00 to 5.50
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

	Per Net Ton
Iron angle and splice bars	$5.25 to $5.75
Iron arch bars, transoms	5.00 to 5.50
Iron car axles	11.00 to 11.50
Steel car axles	9.00 to 9.50
No. 1 railroad wrought	5.50 to 6.00
No. 2 railroad wrought	5.50 to 6.00
No. 1 busheling	2.50 to 3.00

No. 2 busheling	$2.00 to	$2.50
Locomotive tires, smooth	7.50 to	8.50
Pipe and flues	1.25 to	1.75
No. 1 machinery cast	6.25 to	6.75
Clean automobile cast	6.75 to	7.25
No. 1 railroad cast	5.50 to	6.00
No. 1 agricultural cast	5.75 to	6.25
Stove plate	5.50 to	6.00
Grate bars	5.25 to	5.75
Brake shoes	6.25 to	6.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.50
No. 2 heavy melting steel	5.50 to	6.00
No. 1 railroad wrought	7.50 to	8.00
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	6.00 to	6.50
Hydraulic compressed, old	4.00 to	4.50
Machine shop turnings	3.50 to	4.00
Heavy axle turnings	5.50 to	6.00
Cast borings (nom.)	3.00 to	3.50
Heavy breakable cast	9.00 to	9.50
Stove plate (steel works)	6.50 to	7.00
No. 1 low phos. heavy	10.00 to	10.50
Couplers and knuckles	9.00 to	9.50
Rolled steel wheels	9.00 to	9.50
No. 1 blast furnace (nom.)	3.00 to	3.50
Spec. iron and steel pipe	5.50 to	6.00
Shafting	11.00 to	11.50
Steel axles	12.00 to	13.00
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels		10.00
No. 1 cast	9.50 to	10.00
Cast borings (chem.)	8.00 to	10.00
Steel rails for rolling	9.00 to	9.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.50
No. 2 heavy melting steel	6.50 to	7.00
Compressed sheet steel	6.50 to	7.00
Light bundled sheet stampings	4.50 to	5.00
Drop forge flashings	5.25 to	5.75
Machine shop turnings	4.50 to	5.00
Short shoveling turnings	4.50 to	5.00
No. 1 busheling	5.25 to	5.50
Steel axle turnings	5.00 to	5.50
Low phos., billet crops	10.00 to	11.00
Cast iron borings	3.50 to	4.00
Mixed borings and short turnings	3.50 to	4.00
No. 2 busheling	3.50 to	4.00
No. 1 cast	7.50 to	8.00
Railroad grate bars	5.00 to	5.50
Stove plate	5.00 to	5.50
Rails under 3 ft.	8.50 to	9.00
Rails for rolling	8.50 to	9.00
Railroad malleable	6.75 to	7.00
Cast iron carwheels	7.00 to	7.50

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$7.00 to	$7.50
No. 2 heavy melting scrap	6.25 to	6.75
Scrap rails	6.75 to	7.25
New hydraul. comp. sheets	6.25 to	6.75
Old hydraul. comp. sheets		5.00
Drop forge flashings	6.25 to	6.75
No. 1 busheling	6.25 to	6.75
Hvy. steel axle turnings		6.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	9.00 to	9.50
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	9.50 to	10.00
No. 1 cupola cast	8.50 to	9.00
Stove plate	6.50 to	7.00
Steel rails, 3 ft. and under	9.25 to	9.75
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.00 to	$7.50
Scrap steel rails	7.00 to	7.50
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		9.00
Iron axles		9.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	7.50 to	8.00
No. 1 cast		8.50
Tramcar wheels		8.50
Cast iron borings, chem.		8.50

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$6.00 to	$6.50
No. 1 heavy melting	5.50 to	6.00
No. 2 heavy melting	5.00 to	5.50
No. 1 locomotive tires	5.00 to	5.50
Misc. stand-sec. rails	6.00 to	6.50
Railroad springs	7.25 to	7.75
Bundled sheets	2.00 to	2.50
No. 2 railroad wrought	5.00 to	5.50
No. 1 busheling	3.00 to	3.50
Cast iron borings and shoveling turnings	2.75 to	3.25
Iron rails	7.00 to	7.50
Rails for rolling	7.00 to	7.50
Machine shop turnings	1.50 to	2.00
Heavy turnings	3.00 to	3.50
Steel car axles	8.50 to	9.00
Iron car axles	11.00 to	11.50
Wrot. iron bars and trans.	5.00 to	5.50
No. 1 railroad wrought	3.50 to	4.00
Steel rails less than 3 ft.	7.50 to	8.00
Steel angle bars	6.00 to	6.50

Cast iron carwheels	5.50 to	6.00
No. 1 machinery cast	6.50 to	7.00
Railroad malleable	4.75 to	5.25
No. 1 railroad cast	5.75 to	6.25
Stove plate	5.50 to	6.00
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 60 lb. and over	20.00 to	21.00
Agricult. malleable	4.00 to	4.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.00
No. 2 heavy melting steel	3.50
Heavy melting steel (yard)	1.50
No. 1 hvy. breakable cast	$5.00 to 5.25
Stove plate (steel works)	2.25 to 5.75
Machine shop turnings	0.75 to 1.25
Short shoveling turnings	0.75 to 1.25
Cast borings	0.50 to 1.00
No. 1 blast furnace	0.50 to 1.00
Steel car axles	8.00 to 8.50
Spec. iron and steel pipe	2.00 to 2.50
Forge fire	3.25
No. 1 railroad wrought	4.00 to 4.50
No. 1 yard wrought, long	3.25 to 3.50
Rails for rolling	5.00 to 5.50
No. 1 cast	5.50 to 6.00
No. 2 cast	4.50 to 5.00
Stove plate (foundry)	4.75
Malleable cast (railroad)	4.00 to 4.50
Cast borings (chemical)	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	$9.00 to $9.50
No. 1 hvy. cast (cupola size)	7.50 to 8.00
No. 2 cast	4.00 to 4.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel		$3.50
Scrap T rails		3.35
Machine shop turnings	$0.80 to	1.00
Cast iron borings		1.05
Bundled skeleton, long	2.00 to	2.10
Forge flashings	3.00 to	3.50
Blast furnace scrap	0.90 to	1.00
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	4.50 to	5.00
Cast iron borings, chemical	7.00 to	7.25
Per gross ton delivered consumers' yards:		
Textile cast	$7.00 to	$7.50
No. 1 machinery cast	7.50 to	8.00
Stove plate	5.00 to	5.25
Railroad malleable	8.00 to	8.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$6.00 to	$6.50
Scrap rails for melting	6.00 to	6.50
Loose sheet clippings	1.50 to	2.00
Bundled sheets	3.75 to	4.25
Cast iron borings	3.25 to	3.75
Machine shop turnings	3.00 to	3.50
No. 1 busheling	4.50 to	5.00
No. 2 busheling	2.75 to	3.25
Rails for rolling	6.50 to	7.00
No. 1 locomotive tires	7.50 to	8.00
Short rails	9.00 to	9.50
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	8.25 to	8.75
No. 1 railroad cast	7.75 to	8.25
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable	7.75 to	8.25
Railroad malleable	8.25 to	8.75

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$5.50 to	$6.00
Borings and short turnings	2.75 to	3.25
Long turnings	2.75 to	3.25
No. 1 machinery cast	7.75 to	8.25
Automotive cast	8.50 to	9.00
Hydraul. comp. sheets	5.25 to	5.75
Stove plate	3.75 to	4.25
New No. 1 busheling	4.75 to	5.25
Old No. 2 busheling	1.50 to	2.00
Sheet clippings	2.00 to	2.50
Flashings	4.00 to	4.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy metling steel	$7.00	$8.00
Rails, scrap	7.00	8.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	10.00	9.50
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	3.45c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.10c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.74
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.
Track bolts, all sizes, per 100 count,	70 per cent off list
Machine bolts, 100 count,	70 per cent off list
Carriage bolts, 100 count,	70 per cent off list
Nuts, all styles, 100 count,	70 per cent off list
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.75
Wire, galv. soft, base per 100 lb.	3.20
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.35

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinfore. bars, billet steel	1.50c. to 1.75c.
Rail steel reinforcement	1.20c. to 1.30c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, ¼ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 22)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes (¼ in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Coach and lag screws	70
Hot-pressed nuts, sq., tap. or blank	70
Hot-pressed nuts, hex., tap. or blank	70
Hex. head cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws	52½
Spring cutters	60
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	6.00c. to 6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.39c.
Flats and squares	3.89c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, ¾ x ⅛ in. and larger	3.60c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.
	Per Cent Off List
Tank rivets, ⅞ in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.10c.
*Structural shapes	2.10c.
*Soft steel bars, small shapes, iron bars (except bands)	2.10c.
Reinfore. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
*Steel hoops	2.65c.
*Steel bands, No. 12 to 3/16 in., incl.	2.40c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
*Hot-rolled and annealed sheets (No. 10)	2.55c.
Diam. pat. floor plates, ⅜ in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices for 15,000-lb. orders; extra apply for smaller quantities.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinfore. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	2.95c.
Cold-fin. flats and sq.	3.45c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb.	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinfore. bars	3.00c.
Rails steel reinfore. bars	3.00c.
Hoops	3.30c.
Bands	3.25c.
Cold-fin. rounds and hex.	3.35c.
Squares and flats	3.85c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot rolled sheets (No. 10)	3.20c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.93
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	2.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.50c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.05c.
Bands	3.30c.
Hoops	3.95c.
Hot-rolled sheets (No. 10)	3.45c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
*Beams, channels, angles, tees, zees	3.00c.
*H beams and shapes	3.00c.
*Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
*Bar and bar shapes (mild steel)	2.90c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, hf. ovals, ovals and bevels	4.15c.
Tire steel, rd. edge 1⅛ x ⅝ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.00c.
Lead coated (long ternes) No. 24 ga.	5.00c.

*Base prices for 15,000 lb. orders, extras apply for smaller quantities.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	3.25c.	3.50c.	3.60c.
Soft steel bars	3.25c.	3.30c.	3.60c.
Reinforcing bars	3.00c.	3.00c.	3.50c.
Hot-rolled annealed sheets (No. 24)	3.95c.	4.20c.	4.50c.
Hot-rolled sheets (No. 10)	3.50c.	3.50c.	4.00c.
Galv. sheets (No. 24)	4.55c.	4.50c.	5.00c.
Struc. rivets, ⅝ in. and larger, less than 1000 lbs.	5.00c.	5.00c.	4.90c.
Cold-finished steel			
Rounds	5.50c.	5.50c.	4.50c.
Squares and hexagons	6.75c.	6.75c.	5.75c.
Flats	7.25c.	7.25c.	6.75c.
Common wire nails, base per keg in less carloads	$2.90	$2.90	$3.00

Plates, shapes, bars, bands and hot-rolled sheets, No. 14 gage and heavier, subject to reductions for quantity. Cold-finished quotations based on 100 lb. minimum quantity.

PLANT EXPANSION AND EQUIPMENT BUYING

Automobile Company Buys Machine Tools

Dodge Brothers Division of Chrysler Places Orders Totaling About $100,000

THE Dodge Brothers division of the Chrysler Corpn. has placed orders for about $100,000 worth of machine tools, including quite a number of gear shapers. Not much other automotive buying is definitely in sight for production of new models. Continental-De Vaux will bring out a new light car, but it will be an assembled job and equipment purchases probably will be light.

The Chicago district continues to show activity in prospects, though actual buying has not increased much if any. A Milwaukee company has issued a list of 12 tools, including radial drills, lathes and milling machines, the largest single inquiry in that district in some time. The St. Charles School for Boys, St. Charles, Ill., is taking bids on woodworking machinery. The Research and Educational Hospital, Chicago, will buy a small engine lathe, a buffing machine, a pedestal grinder and a motor generator set. The International Harvester Co. is expected to issue a list of tool requirements for its Fort Wayne, Ind., plant.

A Pittsburgh district company has bought a large plate planer, the first important purchase in that section this month.

NORTH ATLANTIC

Continental Can Co., 1 Pershing Square, New York, has approved plans for extensions and improvements in plant at Clearing, Ill., including new equipment. Cost about $230,000 with machinery. Company will also carry out expansion and improvements at other plants, including completion of three-story tin can-manufacturing works at Harvey, La. Last noted project will cost over $100,000 with equipment.

Capital Iron Works, Inc., New York, has been organized by Harry Shapiro, 1544 Park Place, and Samuel Mersend, 2022 Union Street, both Brooklyn, to manufacture iron and other metal products.

Gulf Refining Co., 17 Battery Place, New York, has plans for new oil refinery, bulk storage and distributing plant on Staten Island. Cost about $500,000 with equipment. Company has also approved plans for bulk oil storage and distributing plant at Washington, D. C., to cost $300,000 with equipment.

Egan Electric Sign Co., Bronx, New York, has leased three-story building at 4283 Park Avenue, Bronx, for new factory for manufacture of electric signs and displays.

Majestic Steel Products Corpn., Brooklyn, has been organized by Murray B. Gershon, 500 St. Johns Place, and associates, to manufacture steel specialties of various kinds.

Third Avenue Railway System, 2396 Third Avenue, New York, plans rebuilding car repair shop, 60 x 200 ft., recently damaged by fire. Loss over $100,000 with equipment.

New York Dock Co., 44 Whitehall Street, New York, has let general contract to W. H. Storch, 1 Hanson Place, Brooklyn, for two-story shop addition at shipyard, Brooklyn. Cost over $35,000 with equipment.

National Union Radio Corpn., 57 State Street, Newark, manufacturer of radio tubes and equipment, has increased production schedule to five-day week, employees now totaling about 750 at main works and branch factory.

Bamberger Broadcasting Service, 147 Market Street, Newark, operating station WOR, Kearny, N. J., has acquired property at Tremley, near Rahway, N. J., for new broadcasting station of about 50,000-watt capacity. Cost over $100,000 with steel towers, power station and other equipment.

E. T. Edwards, Locust Street, Columbia, Pa., manufacturer of bolts, nuts, rivets, etc., has resumed operations following shut down of several weeks, recalling about 100 men.

Consolidated Products Co., Philadelphia, manufacturer of electrical equipment and appliances, has leased four-story building, 20 x 80 ft., at 336 North Third Street, for new plant.

Bureau of Yards and Docks, Navy Department, Washington, will soon call for bids for new buildings and equipment at Philadelphia Navy Yard, cost $150,000. Steam power house for central heating service, cost $65,000 with equipment, will be built at Naval Ammunition Depot, Fort Mifflin, Pa., and distributing system at same place, cost $48,000.

Mack Products Corpn., Lackawanna, N. Y., has been organized by Walter C. MacGraffic and Ralph F. Johnson, R.F.D., Hamburg, N. Y., and Roy I. Morrison, 201 Smallwood Road, Snyder, N. Y., to manufacture heating equipment, furnaces, etc.

Ritter Dental Mfg. Co., 404 West Avenue, Rochester, N. Y., manufacturer of dental instruments and equipment, has resumed operations following curtailment for several months, recalling about 500 workers.

SOUTH ATLANTIC

Board of District Commissioners, District Building, Washington, asks bids until Oct. 6 for 6000 water meters.

Conneaut Winding Co., Inc., Conneaut, Ohio, manufacturer of electrical specialties, has acquired property at Gastonia, N. C., for new plant, and will remove to that location, increasing capacity.

General Purchasing Officer, Panama Canal, Washington, asks bids until Oct. 12 for one electric-operated revolving crane, 75-ton capacity (Schedule 2793).

Bureau of Yards and Docks, Navy Department, Washington, will take bids soon for work at Norfolk, Va., Navy Yard, including new foundry, cost $215,000 with equipment; new drydock No. 2, $375,000, and extensions and improvements in distributing system, $50,000; also for new hangar with repair facilities, cost $45,000, and distributing system, $25,000, at Marine Barracks, Quantico, Va.; marine railway at Charleston, S. C., Navy Yard, $55,000; new loading plant, $40,000, and underground wiring system, $90,000, at Naval Ammunition Depot, St. Juliens Creek, Va.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 4 for two motor-driven thread milling machines (Schedule 8775), cutting tools, air-escape valves, etc. (Schedule 8717) for Washington Navy Yard; until Oct. 11, one motor-driven power press (Schedule 8752) for Boston, New York, Philadelphia or Los Angeles navy yards; 430 aluminum chairs (Schedule 8768), snap bolts, hasps, staples, screw eyes, door hooks, etc. (Schedule 8753), 14,400 lb. hot-rolled or cold-rolled sheet copper (Schedule 8764) for Eastern and Western yards.

Trafilator Corpn., Staunton, Va., has been organized by H. E. Baylor, Staunton, and Abraham Martin, Hagerstown, Md., to manufacture traffic signal equipment and devices.

Baltimore & Ohio Railroad Co., Baltimore, has recently increased operations at car and locomotive repair shops, recalling over 700 men.

Veterans' Administration, Washington, Procurement Division, asks bids until Oct. 4 for four electric tool grinders (Proposal 108-M), one portable electric hammer (Proposal 125-M), two sump pumps (Proposal 64-M); until Oct. 3, one pipe and nipple threading machine (Proposal 73-M); until Oct. 6, one boiler feed pump (Proposal 85-M).

CENTRAL DISTRICT

Babcock & Wilcox Co., Barberton, Ohio, manufacturer of watertube boilers, pipe, etc., has plans for one-story addition, 100 x 300 ft., in connection with removal of Bayonne, N. J., plant to this place, where production will be concentrated. Headquarters are at 85 Liberty Street, New York.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of enameled sheet steel and cast iron products, is running on full time basis, giving employment to 375 workers.

Clark Controller Co., 1146 East 152nd Street, Cleveland, manufacturer of electric controllers, switches, etc., has let general contract to J. L. Hunting Co., Guarantee Title Building, for one-story addition, 30 x 157 ft. Cost about $30,000 with equipment.

Veterans' Administration, Construction Service, Washington, asks bids until Oct. 18 for storage and distributing building at institution at Dayton, Ohio, including steel shelving and partitions.

Thew Shovel Co., Lorain, Ohio, has arranged for increase in production schedule, effective immediately, giving employment to about 300 men.

Wheeling Structural Steel Co., Wheeling, W. Va., has dismantled number of buildings at local works and will re-erect different shop units at Martins Ferry, Ohio.

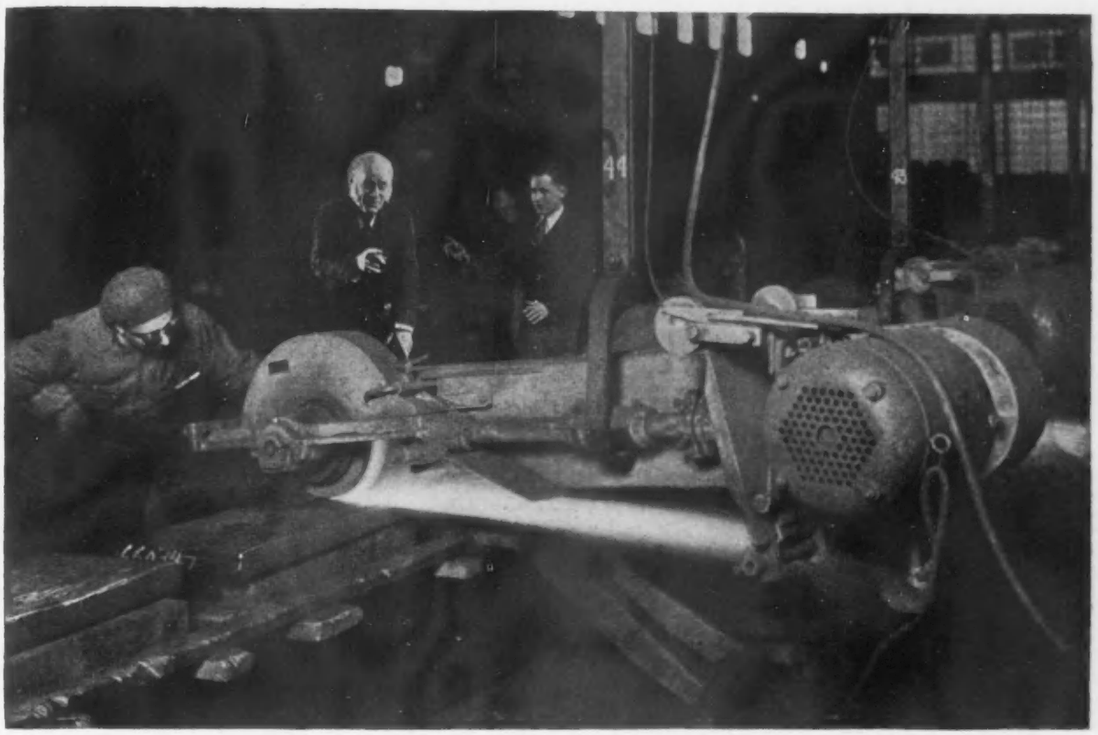
City Machine & Tool Co., Toledo Factories Building, Toledo, Ohio, has increased production schedule, giving employment to about 300 workers on a three-shift day basis.

New York Central Railroad Co., Cleveland, has resumed operations at car shops at Ashtabula, Ohio, following curtailment since last March.

Great Western Oil Co., 2846 East Thirty-seventh Street, Cleveland, a subsidiary of Standard Oil Co., has acquired more than five acres on Mahoning Avenue S. W., with river frontage, as site for new bulk oil storage and distributing plant. Cost about $450,000 with equipment.

Reeves Mfg. Co., Dover, Ohio, manufacturer of steel and sheet metal products, has advanced production schedule, giving employment

POP AND LAD DISCUSS MOTORS FOR GRINDERS



"I see that The Republic Steel Corporation have replaced the ordinary open type motors with Lincoln stainless steel motors on these billet grinders.

"There must be good reasons why they chose *'Linc-Welds.'*

"Of course, I know the *'Linc-Welds'* will outlive the others, because no dirt or dust can get inside their stainless steel enclosures to attack the windings."

"Righto . . . and more important is that extra horsepower that the *'Linc-Welds'* pack.

"On these grinders, sometimes they're overloaded 100%, yet it doesn't faze the *'Linc-Welds'* . . . they've got that extra horsepower always available, whatever the job.

"And *'Linc-Welds'* are money savers, too, since motors are priced on their rated horsepower and not on their overload capacity.

"In these times can you afford to pass up that extra dividend of additional horsepower paid on every dollar invested in *'Linc-Weld'* motors?"

LINCOLN

THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO

Manufacturers of *"Linc-Weld"* Motors and *"Stable-Arc"* Welders

M-7

to about 800 men on three 8-hr. shifts a day, 6-day week.

Keller Mfg. Co., Corydon, Ind., manufacturer of farm trucks and equipment, has adopted overtime production schedule, with full working force.

City Council, Fort Wayne, Ind., has plans for a pumping plant in connection with new Anthony dam for water system. Project will cost about $150,000 with machinery. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

Automatic Store Appliance Corpn., 612 Genesee Bank Building, Flint, Mich., has been organized by Arthur C. Koepke, 313 Paterson Building, and associates to manufacture store equipment and appliances.

Guardian Gauge Co., Detroit, has been organized by Richard S. Spencer, 688 East Fort Street, and associates, capital $50,000, to manufacture oil and gasoline gages and kindred precision equipment.

Lamneck Products, Inc., 416 Dublin Avenue, Columbus, Ohio, has been organized to succeed to business of W. E. Lamneck Co., manufacturer of furnace and stove pipe and fittings, registers, cold air faces and other heating accessories, which had been in receivership since March. New company occupies same plant as predecessor. Paul L. Selby is president.

SOUTHWEST

National Air Control Corpn., Kansas City, Mo., has been organized by Frank G. Baker, 102 East Ninth Street, and associates to manufacture mechanical draft equipment.

City Council, Jonesboro, Ark., is selecting site for a municipal airport and will have plans drawn by C. W. Holderbaum, State House, Little Rock, Ark., State airport engineer, for hangars, repair shop, oil storage and distributing building and other field units. Herman Bosler, mayor, is at head of project.

Transport Refining Co., care of C. P. Ritter, 208 Prospect Avenue, Long Beach, Cal., president, has plans for new oil refinery near Prewitt, N. M. Cost over $100,000 with equipment and pipe lines. Ross Engineering Co., Albuquerque, N. M., engineer, has surveys under way for 35-mile pipe line from oil wells to refinery.

County Urban Water Co., 114 West Tenth Street, Kansas City, Mo., plans installation of pumping machinery and other equipment for expansion of water system in number of townships. Henrici-Lowry Engineering Co., address noted, is engineer in charge.

A.B.C. Oil Burner Corpn., St. Louis, has been organized by Julius Schwander, 3931 Olive Street, and associates to manufacture oil burners and oil-burning equipment.

United Iron Works, Tyler, Tex., has been organized by Ralph C. Myers and J. S. Grisham, Tylor, to manufacture iron and steel products.

Channel Machine Shop, Inc., Corpus Christi, Tex., has been organized by James E. Weatherford, Jr., and G. E. Smith, Corpus Christi, to manufacture machinery and parts and operate a general machine works.

Texas-Louisiana Power Co., Fort Worth, Tex., plans rebuilding power plant at Pilot Point, Tex., recently damaged by fire. Loss about $40,000 with equipment.

MIDDLE WEST

Marquette Petroleum Products, Inc., 2301 South LaSalle Street, Chicago, manufacturer of lurbricating oils and other oil products, has work under way on improvements in two-story building at 7256-70 South Chicago Avenue, recently acquired for new plant, including storage and distributing divisions.

Due Tint Bulb & Battery Co., 4431-33 North Racine Avenue, Chicago, has been organized by Dalton W. Riggs and associates, to manufacture electric batteries, flashlights and kindred specialties.

Chicago, Burlington & Quincy Railroad Co., Chicago, has reopened its car repair shops at Galesburg, Ill., following curtailment for several weeks, reinstating about 200 men.

Metropolitan Utilities District, Harney and Eighteenth Streets, Omaha, Neb., has taken out permit for new generator and blower building for artificial gas system. Cost about $65,000 with equipment.

United States Engineer Office, First District, Chicago, asks bids until Oct 15 for operating machinery for lock gates at Kempsville and LaGrange locks, Illinois waterway (Circular 52).

King Cold Corpn., 2300 South Western Avenue, Chicago, has been organized by Milton K. Joseph and S. Hoyer Evans, capital $250,000, to manufacture electrical refrigerating equipment and other electrical devices.

City Council, Englewood, Colo., has let general contract for municipal power plant, pumping station and waterworks system to Municipal Power Development Co., Pence Building, Minneapolis, to include three oil engine units, pumping machinery, and 250,000-gal. elevated steel tank and tower. Cost about $600,000 with equipment. Bond issue approved. Wood & Weber, Inc., 810 Fourteenth Street, Denver, is consulting engineer.

City Commission, Fort Collins, Colo., has been authorized to arrange bond issue of $745,000 for a municipal electric light and power plant and distributing system.

A. O. Smith Corpn., Milwaukee, has recalled 200 tool makers on full-time schedules in preparation for demands of automobile manufacturers for pressed steel frames. Additional employees will be recalled when actual production gets under way in October. Present payroll numbers about 1800.

Simmons Co., New York, has recalled 200 employees at main works in Kenosha, bringing payroll to 1400. Working schedule has been increased 20 per cent, putting operations on a 44-hr. week basis.

White Machine Works, 750 Wisconsin Street, Eau Claire, Wis., reports maintaining full crew and production schedule of 5000 gas engine piston rings daily. Improved demand also is noted for chromium nickel cylinder sleeves, brake shoes, etc.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 11 for 125 air flask forgings, alloy steel (Schedule 8774) for Newport, R. I., Navy Yard.

B. & J. Auto Spring Co., Inc., Bridgeport, Conn., has been organized by W. W. and A. H. Brodie, Jr., 6 Melbourne Road, Great Neck, L. I., N. Y., to manufacture automobile springs and kindred equipment.

E. Ingraham Co., Bristol, Conn., manufacturer of clocks, clock mechanisms, etc., has advanced production schedule and is now employing about 1400 workers.

Bureau of Yards and Docks, Navy Department, Washington, will take bids soon for extensions and improvements in power plant and distributing system at Boston Navy Yard, cost $50,000 and $75,000, respectively; also for extensions and improvements in power plant at Portsmouth, N. H., Navy Yard, cost $250,000 with equipment; extensions and improvements in distributing system at Naval Submarine Base, New London, Conn., $25,000; seaplane railway, Gould Island, Naval War College, Newport, R. I., $30,000; and fuel oil tanks, Melville, R. I., $65,000.

Board of Education, Greenwich, Conn., has plans for new school at Riverside, with manual training department. Appropriation of $275,000 approved. William F. Dominick, 19 West Forty-fourth Street, New York is architect.

PACIFIC COAST

City Council, Sierra Madre, Cal., is considering erection of a municipal electric light and power plant. Cost about $350,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for 85 steel tanks for storage of helium gas, including drainage piping, draft gages and accessory equipment (Specification 6964); until Oct. 5 for completion of hangar and gasoline pumping station (Specification 6956) at Naval Air Station, Sunnyvale, Cal. Bids will soon be asked for following projects at Pacific Coast stations: Power plant, $325,000 with equipment; railroad tracks, $25,000; distributing system, $60,000, and oil tanks, $18,000, at Mare Island yard; steam lines, $50,000, and improvement of railroad, $35,000, at Naval Ammunition Depot, Mare Island; power plant for central heating service, $180,000, Naval Station, San Diego, Cal.; crane and track, Pier No. 4, $105,000; drydocks Nos. 1 and 2, $75,000; extensions and improvements in power plant, $100,000 with equipment, and in distributing system, $75,000, at Puget Sound Navy Yard; extensions and improvements in power plant at Naval Torpedo Station, Keyport, Wash., $57,000 with equipment.

State Highway Department, Maynard Building, Seattle, has plans for one-story equipment storage, distributing and repair building, 36 x 240 ft.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 4 for one complete rivet heat-treating bath (Schedule 8751); until Oct. 11, ring cowls for aircraft engines (Schedule 8756) for San Diego Navy Yard; until Oct. 11, one portable electric-driven air compressor (Schedule 8770), one motor-driven inclinable press (Schedule 8769) for Mountain View, Cal., Naval Station; until Oct. 4, 1100 cold-drawn seamless boiler tubes (Schedule 8745); until Oct. 11, one milling machine and attachments (Schedule 8749), one precision lathe (Schedule 8793), one surfacer (Schedule 8765) and two wire feed screw machines (Schedule 8771) all motor-driven, for Puget Sound Navy Yard.

Texaco Oil Co., Miami, Ariz., plans rebuilding bulk oil storage and distributing plant recently destroyed by fire. Loss over $100,000 with equipment.

Board of Education, 1151 South Broadway, Los Angeles, plans installation of manual training shop in addition to John Adams junior high school. Cost about $90,000. Architectural department of board, A. S. Nibecker, Jr., architect, in charge.

SOUTH CENTRAL

Merringer-Price Paint Mfg. Co., Paris, Ky., recently organized by John Merringer and B. D. Price, Paris, has acquired building on High Street, for manufacture of paints, varnish, etc., for initial capacity of about 375 gal. daily.

Butcher Tool & Hardware Co., 2019 Third Avenue North, Birmingham, plans rebuilding of portion of storage and distributing plant, recently destroyed by fire. Loss about $35,000 with equipment.

McDermott Surgical Instrument Co., 734 Poydras Street, New Orleans, manufacturer of precision instruments and equipment, is considering erection of new plant unit. Cost about $40,000 with equipment.

City Council, Athens, Tenn., plans installation of pumping machinery and auxiliary equipment in connection with extensions and improvements in municipal waterworks. Cost about $100,000.

FOREIGN

Swiss Government Railways, Bern, Switzerland, plan hydroelectric generating plant on plateau of Etzel, near Einsiedein, in connection with electrification program totaling 400 kilometers (about 250 miles). Cost over $1,000,000.

Soviet Russian Government, Moscow, is planning early electrification of Moscow-Leningrad railway system. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Coming Meetings

October

National Metal Congress and Exposition. Oct. 3 to 7. American Society for Steel Treating, sessions at Hotel Statler, exposition at the 174th Regimental Armory, Buffalo. American Society of Mechanical Engineers, machine shop practice division. American Institute of Mining and Metallurgical Engineers, iron and steel and institute of metals divisions. American Drop Forging Institute, annual meeting. American Welding Society, fall meeting. Society of Automotive Engineers, production meeting. Wire Association, annual meeting.

Trade Practice Conference of ornamental iron, bronze and wire manufacturers under auspices of Federal Trade Commission. Oct. 3, Hotel Riverside, Cambridge Springs, Pa.

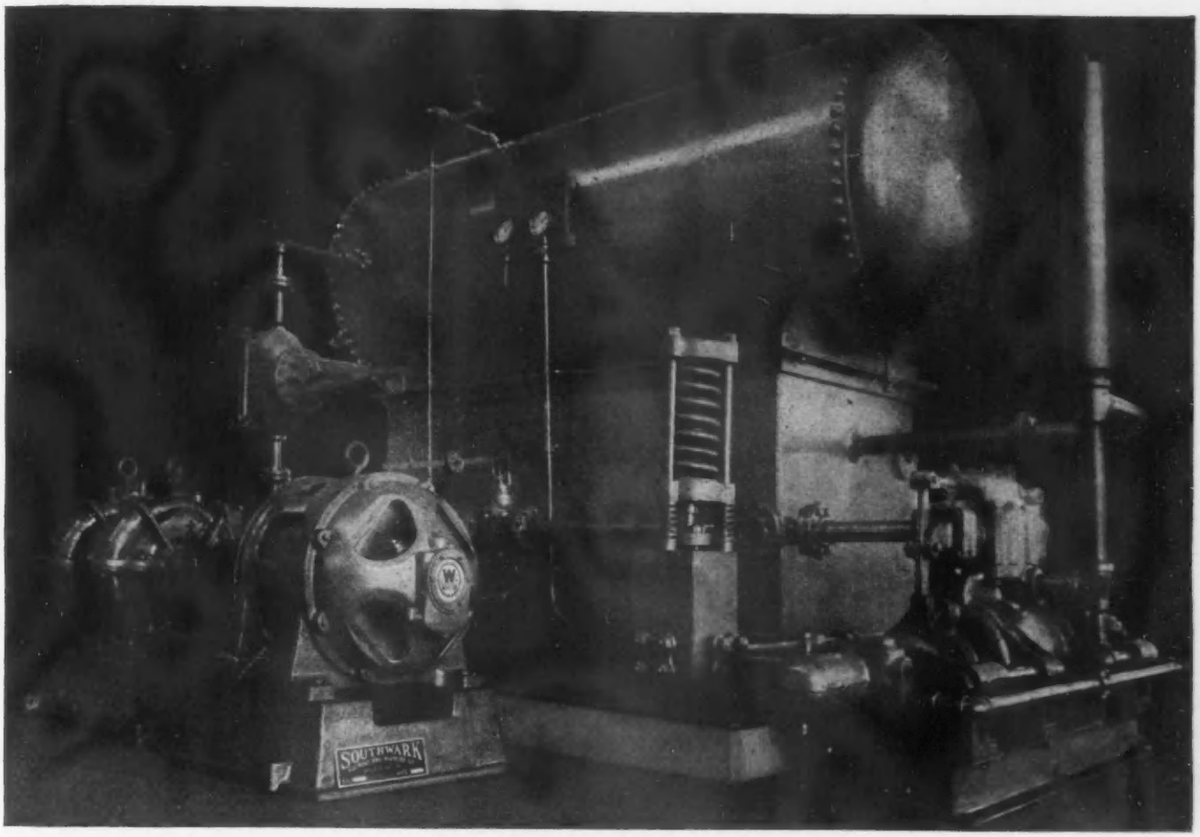
National Safety Council. Oct. 3 to 7. Annual convention, Wardman Park and Shoreham hotels, Washington. H. W. Darr, Bethlehem Steel Co., Johnstown, Pa., secretary of metals section.

National Association of Sheet Metal Distributers. Oct. 18. Fall meeting, Marlborough-Blenheim, Atlantic City, N. J. George A. Fernley, 505 Arch Street, Philadelphia, secretary.

Associated Machine Tool Dealers. Oct. 11 to 14. Fall meeting, New Ocean House, Swampscott, Mass. Harry Barney, Koppers Building, Pittsburgh, secretary.

American Institute of Steel Construction, Inc. Oct. 20 and 21. Tenth annual meeting, Schenley Hotel, Pittsburgh. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

Mining and Metallurgical Advisory Boards, Carnegie Institute of Technology. Oct. 28. Annual meeting, Carnegie Institute of Technology, Pittsburgh. John D. Beatty, Carnegie Institute of Technology, secretary.



The HYLO UNIT eliminates hydraulic accumulators and pipe lines

Now you can use hydraulic power anywhere in your plant—on any floor—independent of the distance from a central source of hydraulic power supply—independent of the location of high pressure pipe lines. Now you may use any one or group of presses at will without the necessity of starting up an extensive hydraulic system.

The Southwark HYLO Pumping Unit is the modern answer to a growing demand for individual self-contained presses with power plants generating power at the point of usage for one or a group of presses. The flexibility that this power unit permits in both the location and operation of presses for the most efficient and economical production results is an item worth investigating.

While retaining all the advantages of the conventional weighted accumulator, the HYLO Unit requires no foundation or ballast, is light, is compact, is portable, and is itself a shock absorber. It may be placed anywhere in the average industrial building, according to convenience or for space economy.

This Unit is made in two types—with single intensifier for individual press operation, or with double intensifier for multiple-cylinder presses or for groups of presses.

Write for further information to Southwark—Hydraulic Headquarters.

BALDWIN-SOUTHWARK CORPORATION
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SOUTHWARK

How Modern Design Policies Cut Distribution Costs

(Concluded from Page 491)

tenance. Usually, design thought is divided between what it is possible to manufacture in the shops and what the consumer wants, but in this bus design the customer was considered as a trinity of interests demanding full attention: the public, the driver, and the operating company. The investigators found that the public wanted good appearance and travel comfort. An honest investigation brought out the fact that appearance really counted; the public was not attracted to take trips in a bus that looked like a truck. What concerned the driver was easy control, power, speed and quick acceleration. But the bus operator was concerned with fuel economy, durability and quick, easy maintenance to cut down shop expense and time lost from active paying service. The real sales application of the product was therefore found to have various angles, and it was the kind of investigation that is applicable to almost any product.

Field Investigations as an Aid to Design

After the general analysis, and to solve the detailed problems, a special group of engineers followed down every complaint and suggestion that had come from the field. They went out into the maintenance shops of the operators. They saw how costly buses were tied up for days while men tinkered awkwardly under the engine. They called for an engine that could be removed quickly with a single block and tackle, so that another one could be installed, and the mechanical work of overhauling done while the bus was in service. Each feature of the bus was thus analyzed, but with the conclusion again in this case that no one design could be expected to remain static. The new bus more than paid for the engineering in increased sales, but as soon as it was on the market the engineering staff was set to work on another complete study, and other models were being built.

Machine tool and metal-working machinery design is necessarily founded on contact with the industrial problems in the respective industry that the machine will serve. In general, the design of machine tools is progressive, and new ideas are incorporated as fast as they are developed, but there have also been periodic high points where numbers of "radical" new designs have appeared all at once. One of the periods followed the introduction of Mushet steels and the Taylor high-speed steels; another came with the need for heavier and more powerful machines to work the nickel and chromium steels which began to be used freely about 1916; and an intensive refining process has been going on in machine-tool design throughout the past decade, culminating recently with such labor-saving devices as hydraulic control.

Machine Tool Industry Broadening Its Design Analysis

The procedure of machine tool builders in the development of their products does not differ widely. All of them have permanent staffs of engineers, and unlike the condition of affairs in many consumer-product plants, the executives themselves are frequently technically trained men. It has become the custom, also, for these manufacturers to have an outside consulting designer of worthwhile reputation on the company staff for a detached viewpoint. Various of them have been bringing in professors of machine design from the colleges for tests and research. This has helped to break down the wall of tradition that can easily build itself around staple articles like the lathe, planer or milling machine.

A typically good visualization method in this class of design is that used by the Bullard company, manufacturer of automatic vertical multiple-spindle lathes. This company has the practice of making up a general sectional layout of a proposed new machine, together with data sheets showing its detailed differences, relative costs, and functions as compared with other machines on the market. Responsible men on the engineering, production and sales staffs go over and discuss these comparisons. This is aimed to catch faulty thinking in advance. Where many machines of one type are to be made, as with milling machines, the Cincinnati Milling Machine Co. makes up wooden models in order to visualize the design.

Probably in no other type of machine design are details worked over more carefully than in machine tools during this period of depression. Besides more convenience and labor-saving controls, the refinements have included stronger and better wearing metals, automatic and semi-automatic lubrication, silent and more efficient gearing, flexibility in drives, inclosed and protected motors with a general preference for the compact flange-mounted motor, brakes, and better appearance.

Suppliers of Machine Elements Spurred by Competition

Not all of this refining work has been done by the engineers of the machinery builders, however. Makers of belting, chain drives, speed reducers, controls and other details have dug into every phase of their respective problems because they individually have had the job of selling against competition and of convincing the machinery builders of the mechanical merits of their mechanisms. One maker of plain bronze and babbitt bearings, confronted by a rush on the part of engineers to ball and roller bearings, put his own specialists into machine tool building plants to make comparative tests. They were thus able to prove definitely the cases where plain bearings were superior to other types. Leather belt manufacturers likewise staged a comeback on a declining market by researches that proved such points as the advantage of having flexibility in the drive between motor and machine. By new methods they were even able to meet the new competition of the V belt for short-center drives.

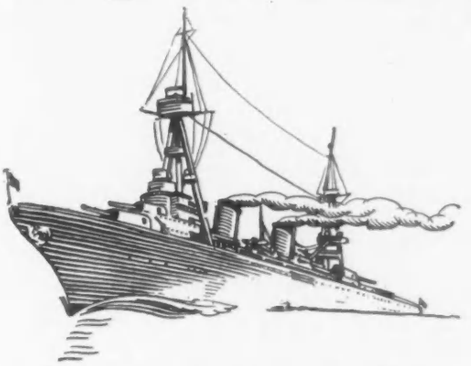
Producers of raw and finished materials have been as enthusiastic as the manufacturers of parts and units in urging redesign to meet the advances. The Aluminum Co. of America has gone so far as to build sample products of its alloys to demonstrate the worth of the materials for specific applications. Companies like the International Nickel Co. have widened their research activities to include the sending out of metallurgists into commercial foundries to show practically the application of new alloys to definite commercial articles. The recent acceptance of molded plastics as construction materials for mechanical parts has called for many changes in design, and these plastics formerly used only for ornaments and electrical insulating parts have now been substituted for cast iron in typewriter frame, for pressed brass for clock cases, and have entirely replaced the old rawhide and fiber gears. With the perfection of strong zinc alloys, also, die casting has advanced at an enormous pace, and many metal parts are now cast in dies to such perfection that machining is often entirely eliminated. An accuracy of 0.005 in. in a die casting is now commonplace, and very thin sections to replace pressed metal are being produced. Strengths of 50,000 lb. per sq. in. and above are obtainable in zinc-base alloys, and much higher strengths in aluminum-base alloys, so that die casting now offers great opportunities to the designer to reduce costs in quantity production articles by the elimination of machining and cutting down of finishing expenses.

Construction Machinery Adopts Progressive Design

Road and construction machinery took an "about face" three or four years ago, and what has happened in this industry makes an interesting study for the design engineer. With the advancing mechanization of construction work there was found a necessity on the part of construction companies to strengthen their staffs

(Concluded on Advertising Page 14)

If you want unbiased help in selecting Alloy Steel . .



■ With scores of alloy steels available, selecting the few that will do your job best is not easy. To give you practical and unbiased help in this task is the purpose of Electromet Engineering Service. ■ Electromet's suggestions are unbiased because Electromet is not a manufacturer of alloy steels, and favors no one producer or product. Selling ferro-alloys to makers of all kinds of steel, Electromet needs—and has—a vast fund of data on every composition. It is from this up-to-the-minute information that Electromet engineers draw when they study your problem and recommend the steel that will suit it best. ■ Taking advantage of this service will insure the results you expect from alloy steels. You are welcome to it at any time. A request on your letterhead will bring you complete information.

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with various types of "engineers" and skilled mechanics. It was a difficult and expensive thing to accomplish because most construction companies consist merely of an operating staff, and these companies depend upon calls to local labor to do the main work. It meant that companies that should be buying labor-saving equipment were not doing so to the extent they should because they feared improper use and rapid deterioration of such equipment by the handling with changing and unskilled crews.

Construction machinery design during the last three years has shown the effects of the consideration of this factor of use by non-mechanical labor. The automobile type of gasoline engine, which is well known to almost any laborer, has replaced steam engines for the power plants. Driving and operating mechanisms have been strengthened, incased with continuous lubrication, and made "fool proof." Mechanisms have been made up in complete unit assemblies for change and replacement in the field without the assistance of skilled mechanics or shop work. There has recently been attempts made to get together between companies and standardize replacement parts such as the steel teeth of graders, so that wearing parts of one make of machine would fit any other machine and thus save delay and annoyance in the field.

The benefits of the redesign in this industry have been cumulative, and this conquering of the unskilled labor problem has made it easier to introduce further mechanisms into machinery that is to be used far removed from repair shops. The fully automatic bituminous paver introduced in 1932 by Barber-Greene is an example of this mechanization. This machine is a combination that would have been considered impractical only a few years ago for any construction gang to handle. It has its own power plant, picks up the raw materials as it moves along, sprays the mixture with hot bitumen as it is conveyed to a pug mill, and then distributes and tamps it into the road, completing a mile of hard-surfaced level road in an 8-hr. day.

This advance in design in the important field of construction machinery was apparent to me in visiting the Road Machinery Show in 1932 after having visited and discussed the situation with the engineers two years before. Types of machinery that in 1930 had little or no anti-friction bearings or automatic lubrication were completely changed over to require less maintenance. The redesign in materials was very apparent, high-strength steels being adopted to eliminate breakage of parts in the field, and welding replacing riveting to cut down the cost of these expensive machines. It was likewise the same with the machines exhibited at the Food Industries Show, and with those of other industries. Great progress has been made during these years of depression, but greater advances will still be realized in the next few years.

Will Design Progress Become Too Rapid?

As design becomes more and more active at the end of the low-business period, the question may be asked, "Will not design become so highly competitive, and the copying of developments be so rapid, that a situation may come about that will be comparable with the cut-throat high-pressure selling of 1928 and 1929?" An examination of what happened in the radio industry will give a partial answer to this problem: As the radio became a recognized consumer-demand article after 1921 there was a rush of manufacturers into the field. By 1926 designs had become so competitive that every detail of the equipment was studied for betterment and for cost reduction. Sheet-metal stampings, screw machine parts, and die-cast parts were adopted universally to cut manufacturing costs. Soldered joints and "bus bars" were eliminated by clever arrangements of the stampings and by unit sections, parts were joined by tubular rivets, "cans" were made of aluminum because the metal, although more expensive than the brass formerly used, could be deep-drawn in one operation. By 1931 the result was more efficient and better-looking radios for less than $50 than could be procured three years before for $300. But the competition was just as keen between companies as it had been previously because all had followed the same intensive design procedure. Companies that had not put maximum effort on redesign were out of business, and no company today in the radio field that is not technically equipped to follow the rapid progress of the industry and incorporate advances immediately into its product can live more than a season.

It is true that this is typical of what may happen in many industries as the design competition increases, but it is only a stronger argument for more alertness in development work. There is no manufacturer today who can afford to be content with what he has achieved. There is no "best" product. There is no "last word" in design. Any product can be bettered, and usually some entirely new product will come to replace it. Only those manufacturers who make engineering a keystone of their business can continue to have profitable businesses during the coming cycle.

Liquid Baths for Heat Treating

(Concluded from Page 499)

properly cared-for bath. It is perhaps easier for a furnace builder to obtain reasonable uniformity with a salt bath than with an oven-type furnace, but it must be stated that temperatures within a salt bath are not and, owing to the inherent characteristics of a heated bath, never can be absolutely uniform.

Salt vs. Lead Baths

A brief comparison of salt and lead baths follows:

(1) Salts usually are more easily cleaned, than is lead, out of holes and depressions in the work.

(2) Lead may be melted and heated more rapidly than can salt baths, owing to the higher conductivity of the former.

(3) Work floats on lead, and usually must be held firmly in place, whereas metals need merely be suspended in salt baths.

(4) Most salts are to some extent hygroscopic, and must be stored in air-tight containers when not in use.

(5) Aside from its tendency to oxidize, lead maintains a stable composition, whereas most salts undergo some decomposition during use.

(6) Lead is neutral to most refractories, though lead oxide is not.

(7) Lead costs more initially than salts.

(8) Less mechanical (drag-out) loss is suffered by a properly protected lead bath than by salt baths during operation.

(9) The surface of a lead bath must be protected from the atmosphere.

(10) Lead heats work more rapidly than do salt baths; hence lead is usually preferable for local heating.

The ideal salt bath, then, should be inert to the metal heated therein, should not change in composition or form a sludge, should not fume corrosively, should clean easily, should not pit or corrode either the work or the bath container, should be thinly fluid at the operating temperature, and should be non-hygroscopic.

The ideal salt bath, however, has not yet been discovered. Practically all the salts used for heat treating are hygroscopic (absorb water from the atmosphere) to some extent. All adhere to the work when it is removed. This increases consumption of salt, but protects the work; the amount of drag-out varies, of course, with the viscosity of the bath and with the shape of the work, but is usually between 4 oz. and 1 lb. of salt per 100 lb. of work. There is almost always a corrosive action at the surface of a salt bath, affecting containers, thermocouple tubes, hooks and partly immersed work. This action is more severe the higher the temperature. *(To be continued)*

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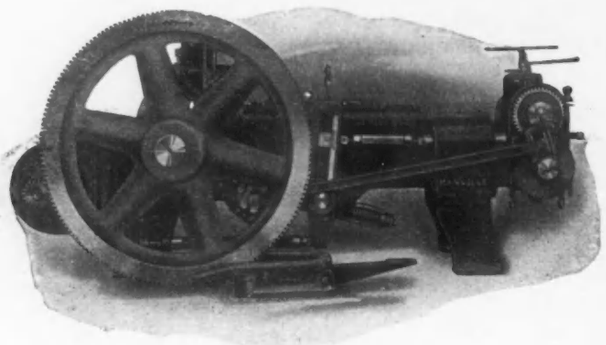

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Production Control Aided by Recording Instrument

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chines in the National Acme and other plants, these including automatic screw machines, centerless and internal grinders, thread rollers, cold headers, mechanical broaches, punch presses and trimming machines. It may be used on multiple production units by contacting one switch with each spindle and another switch with a machine cycle shaft. The National Acme Co. is also using the device on an inspection bench in connection with a tolerance gage to count motor starter rear end plates during inspection. This count is made by applying a contact switch lever to the gage. Two girls, who could inspect 350 pieces per hour according to time study estimates, gradually increased their output to an average of 600 pieces per hour, which is being maintained.

Piece count is of secondary importance on large tools, such as large boring mills and planers, but idle time on these machines is very expensive and the Chronolog keeps a record of this lost time.

Marked increase in output is being attained in the National Acme plant on machines equipped with the instrument. In one case a Chronolog-equipped machine in a battery is producing considerably more than heretofore and more than any of the remaining machines in the group, although the output of the machines not equipped with Chronologs has been increased, evidently because the one so equipped seemed to have served as a pace-setter.

How the Instrument Aids Management

The Chronolog is designed to give the management a true record of what is going on in the shop, to show the major causes of wasted time so that these may be studied and lost time reduced while the job is still under production, to permit a closer control of the inspectors, repair men, stock handlers, etc., and to enable the management to decide intelligently where added equipment or replacements will show a profit. It is claimed that it proves of aid to the foreman in that it enables him to supervise his department more closely. It is stated to eliminate differences of opinion on the bonuses, premium rates and piece-work rates by giving more accurate and complete data than can be obtained from time studies and at a lower cost, and gives the foreman close control of inspectors, set-up men and other non-productive labor. By revealing causes of idle time it should help the operator to earn more money, it is pointed out.

The Chronolog is being manufactured by the National Acme Co., and distributed by the Graybar Electric Co.

The 1931 output of silica brick reported to the Bureau of the Census totaled 106,000, with a value of $5,239,000, as against 212,640, valued at $11,523,169, in 1930, and 294,402, valued at $15,165,260, in 1929. The 1931 output of magnesite and chrome brick was 8000, valued at $2,234,000, against 13,432, valued at $3,878,054, in 1930, and 17,399, valued at $5,630,647, in 1929. The 1931 production of graphite crucibles was valued at $1,056,000, against $2,751,736 in 1929. No data are given for 1930.

Electric Hoist Manufacturers' Association reports that the number of hoists ordered in August increased 53 per cent, as compared with the previous month. Shipments were 70.6 per cent greater in August than in July.

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